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The Impact of the Self-Determined Learning Model of Instruction on Student Self-Determination in Inclusive Secondary Classrooms

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Abstract

Previous research reported differences in student self-determination based on disability status. Specifically, students without disabilities consistently self-report higher self-determination compared with their peers with disabilities, suggesting differential opportunities and supports for self-determination exist within school contexts. To further examine potential differences in student self-determination, the present study examined the impact of an evidence-based practice designed to promote student self-determination, the *Self-Determined Learning Model of Instruction* (SDLMI), on student self-determination outcomes when implemented in inclusive secondary core-content classrooms as a universal (i.e., Tier 1) support across an academic year. Findings suggested a relatively small change in overall self-determination during the first year of a multiyear study but consistent patterns across students with and without disabilities. Implications for research and practice are discussed.

Keywords

self-determination, inclusive education, multitiered systems of support

In the school context, enhancing self-determination, or the skills and abilities people need to act or cause things to happen in their lives as they set and work toward goals, is a key part of promoting meaningful outcomes for *all students*. Self-determination develops across the life course as people have repeated opportunities and experiences to develop and use skills and abilities associated with self-determination, including making decisions, expressing preferences, solving problems, setting and achieving goals, and acquiring self-awareness and self-knowledge. College and career readiness frameworks include self-determination for all students (Lombardi et al., 2018; Morningstar et al., 2018), and self-determination is a critical predictor of a successful transition from high school to postsecondary education, employment, and community life (Shogren, Wehmeyer, Palmer, Rifenbark, & Little, 2015; Test et al., 2009). Although enhancing self-determination is advocated for across the general and special education fields, the majority of comprehensive self-determination intervention research has targeted students with disabilities (Algozzine et al., 2001; Burke et al., 2018) as a means to improve disproportionately poor postschool outcomes (Newman et al., 2011; Nord et al., 2015).

Recently, leaders in the field of school reform have advocated for building *integrated systems of supports* within schools to address the complexities of implementing whole-school interventions with fidelity that support all students (Lane et al., 2020; Sailor, 2008–2009). This reframing of school structures shifts the focus toward equity-based education (Artiles & Kozleski, 2016), emphasizing the distribution of evidence-based supports and services on the basis of measured needs to successfully engage all students in the learning process (The Schoolwide Integrated Framework for Transformation [SWIFT] Education Center, 2017). Integrated systems of supports are often designed around three-tiered models that are premised on providing high-quality, universal supports for all students (i.e., Tier 1 supports), with more intensive supports for students to learn and participate in the curriculum and address learning needs (i.e.,

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Tiers 2 and 3 supports). It is important to note that within a tiered model of supports, the starting point for intervention supports is always Tier 1 with more intensive supports only provided after effective Tier 1 supports and instructional strategies are attempted with fidelity (Lane et al., 2007). Given the importance of self-determination for all students' postschool success, there is a critical need to examine the impact of interventions designed to promote self-determination when they are provided as a universal, Tier 1 support in inclusive classrooms (Shogren et al., 2016).

Self-Determination

A recent theoretical reconceptualization of self-determination, Causal Agency Theory, defines self-determination as a

> dispositional characteristic manifested as acting as the causal agent in one's life. Self-determined people (i.e., causal agents) act in service to freely chosen goals. Self-determined actions function to enable a person to be the causal agent is his or her life. (Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015, p. 258)

Causal Agency Theory builds on previous theoretical conceptualizations of self-determination, integrating recent research from the broader education and psychology fields, emphasizing the connection between self-determination and goal-directed action. For secondary students transitioning to postschool settings (e.g., postsecondary education, employment), acting as causal agents and self-regulating actions toward self-selected goals are essential to the development of self-determination. To support researchers and educators in integrating self-determination theory into practice, Causal Agency Theory specifies that there are three essential characteristics of self-determination: *volitional action* (selecting goals based on one's preferences and needs), *agentic action* (self-directing planning actions that support goal attainment), and *action-control beliefs* (believing in one's abilities to reach self-selected goals). Self-determined people act volitionally by making conscious choices and decisions based on their preferences, values, and beliefs (Shogren et al., 2017). Volitional action includes two component constructs: autonomy (acting based on one's preferences, interests, beliefs, and values without undue outside influence) and self-initiation (initiating actions to identify a goal using past experiences as a guide; Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015). In addition, self-determined people act agentically by planning actions to work toward goals and identifying pathways that lead to a specific, intended outcome (Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015). Agentic action involves two component constructs: self-direction (directing actions toward goals and responding to challenges along the way) and pathways thinking (identifying different ways to solve problems while working toward goals; Shogren et al., 2017). A final critical aspect of self-determination is recognizing one's own abilities that support goal achievement, or acting with action-control beliefs. Action-control beliefs include three component constructs: psychological empowerment (believing one can achieve their goals when they try), self-realization (utilizing knowledge of strengths to work toward goals), and control expectancy (believing one can use resources and supports to achieve their goals; Shogren et al., 2017).

The emergence of Causal Agency Theory created a need for a new assessment that integrates knowledge from fields of education and psychology on how adolescents and young adults develop self-determination. To address this area of need, Shogren, Little, et al. (2018) described the development and validation of the Self-Determination Inventory: Student Report (SDI:SR; Shogren & Wehmeyer, 2017). The 21 items of the SDI:SR represent three essential characteristics of self-determined action (volitional action, agentic action, and action-control beliefs) as well as associated component constructs. Through confirmatory factor analysis (CFA), items and scores on the SDI:SR were shown to be reliable and valid across students ages 13 to 22 with varying disability labels and from diverse racial/ethnic backgrounds (Shogren, Little, et al., 2018). Further analyses demonstrated that differences in student personal characteristics (i.e., disability status, race/ethnicity; Shogren, Shaw, et al., 2018) affected self-determination. Specifically, White/European American students without disabilities consistently scored highest on the SDI:SR compared with adolescents from Other racial/ethnic backgrounds and with disabilities, hypothesized to result from differential opportunities and supports for self-determination provided by support systems (e.g., schools). These findings aligned with previous research suggesting an interactive effect of disability and race/ethnicity on student self-determination scores (Shogren & Shaw, 2017), reinforcing the ongoing need to consider how to deliver tiered self-determination instruction to benefit all students in inclusive environments.

The Self-Determined Learning Model of Instruction (SDLMI)

The SDLMI (Shogren, Raley, et al., 2018; Wehmeyer et al., 2000) is a model of instruction aligned with Causal Agency Theory. It is designed to enable general and special education teachers to promote causal agency by supporting students to learn to actively direct their goal setting and attainment, solving problems encountered as they take actions in service of their goals. Researchers have suggested the efficacy of the SDLMI in producing positive student outcomes, including enhanced self-determination (Shogren, Burke,

et al., 2018), access to the general education curriculum for students with disabilities (Agran et al., 2001), and academic- and transition-related goal attainment (Shogren, Burke, et al., 2019; Shogren et al., 2012). Most studies investigating the impact of the SDLMI have targeted students with disabilities (Hagiwara et al., 2017). However, potential benefits of implementing the SDLMI for all students, inclusive of students with disabilities, have been demonstrated in recent, small-scale research.

Raley et al. (2018b) explored the impact of implementing the SDLMI in two inclusive Algebra I classes in which the mathematics general education teacher was struggling to engage all students in actively monitoring and regulating their learning. After one semester of SDLMI implementation led by the general education teacher with support from research staff, students in both classes were able to identify and set goals to facilitate their academic learning (e.g., "I will highlight important parts of my notes after each math class") after instruction and support from the teacher on what those goals could like and how they could support achievement (see Raley et al., 2018a, for information on whole-class SDLMI implementation). Furthermore, more than 90% of students reported achieving expected or higher levels of attainment of these goals, and the teacher reported high engagement with the intervention and meaningful outcomes beyond goal attainment. Although findings from Raley et al. (2018b) suggested potential benefits of implementing the SDLMI in inclusive secondary classrooms, analyses were restricted given the small sample size and short implementation time frame (i.e., one academic semester lasting approximately 16 weeks).

To address the areas of needed research identified by Raley et al. (2018b), the present study reports the findings from an analysis of the impact of the SDLMI on student self-determination when implemented in inclusive secondary classrooms as a Tier 1 intervention across an academic year with a larger sample of students with and without disabilities. The following research questions guided this analysis:

Research Question 1 (RQ1): To what degree does student self-determination change across an academic year when students engage in the SDLMI in inclusive secondary classrooms?

Research Question 2 (RQ2): What is the moderating impact of disability status on the relationship between SDLMI implementation and student self-determination?

Method

Sample and Setting

The sample consisted of 992 high school students and 17 general and special education teachers. Students and teachers were recruited from six high schools across two states in the U.S. mid-Atlantic during the 2018–2019 academic school year, with a focus on ninth-grade core content classes. As such, the majority of students were enrolled in ninth grade ($n = 951$, 95.9%), with a small number of students in higher grades ($n = 26$, 2.6%) but still enrolled in ninth-grade core content classes. The six high schools were the first of three cohorts of schools recruited to participate in a 3-year, randomized controlled trial (RCT) comparing the impact of different types of implementation supports (online vs. online + coaching) for SDLMI implementation on student (e.g., self-determination, goal attainment, academic achievement) and teacher (e.g., knowledge, skills, and usefulness of self-determination) outcomes when implemented in inclusive general education classes. Data used for the present analysis are from the multiyear RCT, specifically data collected during the first year of implementation.

Table 1 provides student demographic information obtained from administrative data. In the student sample, there were 526 (53.0%) males and 460 (46.4%) females. Forty-three percent of students identified as White/European American ($n = 427$) followed by African American/Black ($n = 396$, 39.9%), Hispanic or Latinx ($n = 91$, 9.2%), and two or more races ($n = 31$, 3.1%). Almost 20% of the sample had an Individualized Education Program (IEP; $n = 185$, 18.6%) as reported by administrative data. The largest disability category was learning disabilities ($n = 108$, 10.9%) followed by other health impairment ($n = 41$, 4.1%) and autism spectrum disorder ($n = 13$, 1.3%). Teacher implementers included trained general ($n = 12$) and special education teachers ($n = 5$) across English language arts (ELA; $n = 20$) or science ($n = 16$) classes. The majority of teachers identified as female ($n = 15$, 88.2%; male: $n = 2$, 11.8%) and White/European American ($n = 15$, 88.2%; African American/Black: $n = 1$, 5.9%; Hispanic/Latinx: $n = 1$, 5.9%). All teachers were certified in the subject areas they taught. The collaborative relationships across general and special education varied across schools. Specifically, two general education teachers (11.8%) indicated they did not collaborate at all with other teachers, whereas the rest of the teacher sample partnered with other teachers to some extent by coassessing student performance and progress ($n = 11$, 58.8%), coplanning lessons ($n = 9$, 52.9%), coteaching some class sessions ($n = 9$, 52.9%), and coteaching all classes ($n = 6$, 35.3%). Class sizes ranged from 13 to 29 students.

Intervention

All teacher implementers received a standardized, 2-day SDLMI in-person training in the summer prior to fall semester implementation. Participating teachers also received ongoing implementation supports (online or online + coaching) throughout the academic year based on random

Table 1. Sample Demographics.

Characteristic	*n*	%
Grade		
9th	951	95.9
10th	22	2.2
11th	3	0.3
12th	1	0.1
Missing	15	1.5
Gender		
Male	526	53.0
Female	460	46.4
Missing	6	0.6
Race/ethnicity		
White/European American	427	43.0
African American/Black	396	39.9
Hispanic or Latinx	91	9.2
Two or more races	31	3.1
Asian American	30	3.0
American Indian/Alaska Native	5	0.5
Hawaiian Native or Pacific Islander	3	0.3
Missing	9	0.9
Disability		
No disability	803	80.9
Learning disabilities	108	10.9
Other health impairment	41	4.1
Autism spectrum disorder	13	1.3
Emotional or behavioral disorder	6	0.6
Intellectual disability	5	0.5
Speech-language impairment	5	0.5
Physical disabilities	2	0.2
Traumatic brain injury	2	0.2
Hearing impairment	1	0.1
Missing	6	0.6
Individualized Education Program (IEP) status		
No	803	80.9
Yes	185	18.6
Missing	4	0.4
Free and reduced-price lunch status		
No	489	49.3
Yes	453	45.7
Missing	50	5.0

Note. $N = 992$. The total of percentage for each characteristic may not be 100% due to rounding.

assignment at the school level. Consistent with SDLMI implementation protocols (Shogren, Raley, & Burke, 2019), general and special education teachers were trained to provide two SDLMI whole-class mini lessons (e.g., approximately 15-min instructional sessions) each week. The SDLMI mini lessons are grouped into three distinct phases: set a goal (Phase 1), take action (Phase 2), and adjust goal or plan (Phase 3). Students are supported by teachers to solve an overall problem in each phase by answering four *student questions*, which guide students in self-regulating their actions (12 student questions total). Each student question is associated with *teacher objectives* that serve as a "road map" for teachers to implement instruction associated with the student question. To meet the targeted teacher objectives, teachers utilize *educational supports* (e.g., problem-solving instruction, self-monitoring instruction), which teaches students skills to make progress toward their self-selected goals. To support implementation in inclusive general education classrooms, teachers were trained in specific strategies aligned with whole-class SDLMI implementation (Raley et al., 2018a), including establishing "goal buckets" of common areas of need related to the content before students engage in Phase 1 and using peer support activities to build a community of learners engaged in goal-directed action.

Teachers engaged students in the three phases of the SDLMI once per semester, meaning that students worked through the entire SDLMI process in their core content class twice during the school year, setting and working toward two goals. This process was consistent with SDLMI implementation protocols, which emphasize the importance of repeated opportunities and experiences in setting a goal, taking action to achieve that goal, and self-evaluating the goal or plan. Implementation fidelity data were collected for both mini lessons and core content instruction. Fidelity data showed teacher implementation fidelity was at expected levels across targeted dimensions (i.e., adherence, quality of delivery, and participant responsiveness) and consistent across the three phases of the SDLMI (Shogren et al., in press).

Measures

The SDI:SR (Shogren & Wehmeyer, 2017) was utilized to collect data on student self-determination at the beginning (prior to intervention or baseline), middle, and end of the school year. Students took the SDI:SR in a customized, online platform by responding to 21 items, providing responses using a slider scale that the computer scores as discrete responses between 0 (*disagree*) and 99 (*agree*). The custom online system included embedded accessibility features (e.g., in-text definitions, audio playback). An overall self-determination score, as well as scores for the three essential characteristics defined by Causal Agency Theory, are automatically calculated and provided to students via a downloadable report and saved in a secure data management system. At each timepoint (three in total), the SDI:SR took students approximately 10 min to complete.

Data Analysis

To answer the research questions, we employed factor analytic methods. Using CFA (Kline, 2010), we first examined whether the data supported an overall self-determination

construct or a three-factor model (i.e., volitional action, agentic action, and action-control beliefs). Next, to address RQ1, we employed longitudinal CFA (Little, 2013), which utilized the entire sample available. This approach provided a proper examination of time invariance due to its ability to freely estimate model parameters at each timepoint. Prior to answering RQ2, it was necessary to first examine time invariance. Assuming time invariance was met, we planned to employ multiple group longitudinal CFA (MG-CFA) and multiple group structural equation modeling (MG-SEM; Kline, 2010) to answer RQ2 (i.e., the impact of disability status on student self-determination). We assessed the merit of these hypothesized models using the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the comparative fit index (CFI), and the Tucker–Lewis index (TLI). Hu and Bentler (1999) recommend CFI and TLI values of 0.95 or greater, RMSEA values less than 0.06, and SRMR values of 0.08 or lower as indicative of a close fitting model. All models were executed in R version 3.5.1 using the lavaan package (Rosseel, 2012). Full information maximum likelihood (FIML) was used to handle missing data, and model parameters were estimated using the robust maximum likelihood (MLR) estimator. Due to our use of the MLR, for each model, we estimated CFI and TLI in the fashion proposed by Brosseau-Liard and Savalei (2014).

RQ1: Change in student self-determination across an academic year. To make inferences regarding self-determination over time, it was necessary to establish that the same construct was being measured at each timepoint. Therefore, we executed time invariance testing to establish whether the SDI:SR functions the same over time. Similar to measurement invariance, time invariance testing involves the estimation of four models: (a) configural, (b) equal loadings (weak), (c) equal intercepts (strong), and (d) equal unique residuals (strict); however, the latter level of invariance is often considered to be too restrictive (Little, 2013) and was not pursued in this study. Prior to estimating this series of models, it was necessary to first estimate the appropriate null model to ensure the CFI and TLI were estimated correctly as these indices represent improvement in model fit relative to some baseline model (Little et al., 2007). The appropriate null model for RQ1 was one in which a mean and variance were estimated for each item that were constrained across time, and items were modeled to be orthogonal (i.e., unrelated to one another). First, we modeled correlated residuals within an item across time to properly account for the dependency in the data (e.g., Item 1, Time 1 with Item 1, Time 2). Second, we utilized the fixed factor method of identification, which required the latent variance to be fixed to 1.0 and the latent mean to be fixed to 0.0.

The configural model is the most complex as each parameter (e.g., factor loadings, manifest intercepts) is freely estimated over time. Configural invariance is established given acceptable data–model fit. Next, we constrained the factor loadings to be the same across time while freely estimating the latent variance at Time 2 and at Time 3, representing the weak invariant model and covariance structure. Then, we constrained the manifest intercepts to be the same across time while freely estimating the latent mean at Time 2 and Time 3—demonstrating the strong invariance model and mean structure. To determine whether weak and strong invariance was met, we used the guidelines put forth by Cheung and Rensvold (2002). Specifically, if the change in CFI (ΔCFI) was 0.01 or less, moving from one model to the next (i.e., weak to strong) is indication the constraint is tenable (i.e., establishing invariance).

RQ2: Impact of disability status on student self-determination. To address RQ2, we examined whether the SDI:SR functions the same across groups (i.e., students with and without disabilities). We conducted measurement invariance tests while modeling time invariance, effectively examining the functioning of the SDI:SR across time and group. Similarly, it was necessary to estimate the appropriate null model, which was nearly identical to before with an additional constraint: equating the item means and variance across groups. Using the same model structure (i.e., correlated residuals within items across time) as before, we proceeded to test the configural, weak, and strong invariant models. The manner in which we determined whether a given constraint was tenable was the same as before (i.e., ΔCFI less than or equal to 0.01). To make meaningful comparisons regarding latent variances, weak invariance is required, whereas strong invariance is required to make inferences regarding the latent mean across time.

To test for latent invariance, we utilized the marker variable method of identification, whereby the factor loading for the first item was fixed to 1.0 and its respective intercept was fixed to 0.0, as this method has no effect on model fit and provided us with a more meaningful latent mean as it is in the metric of the observed data (Little, 2013). To determine whether constraints on the latent parameters were tenable, we carried out the appropriate chi-square difference ($\Delta\chi^2$) test as described by Satorra and Bentler (2010) based on our use of the MLR estimator. The first step in latent invariance testing is to examine the latent variance (Little, 1997, 2013). Specifically, an omnibus test was carried out that simultaneously constrains the latent variance to be the same across time and groups (i.e., students with and without disabilities); therefore, instead of estimating six unique latent variances, only one is estimated. If the omnibus test indicates that this constraint is untenable as informed by a chi-square difference test, constraints are placed by group (i.e., students with and without disabilities) and then by time (i.e., beginning, middle, and end of year timepoints). This same process was undertaken to test the latent means

Table 2. Descriptive Statistics Across Measurement Timepoints and Groups.

Timepoint/group	*n*	*M*	*SD*
SDI:SR (Time 1)	739	79.82	13.790
No disability	611	79.96	13.481
Disability	127	79.20	15.264
SDI:SR (Time 2)	687	77.91	14.983
No disability	561	78.02	14.985
Disability	123	77.38	14.983
SDI:SR (Time 3)	586	79.42	15.763
No disability	480	79.47	15.417
Disability	103	79.44	17.222

Note. SDI:SR = Self-Determination Inventory: Student Report.

across groups and time. To better understand the magnitude of mean differences, we estimated a latent effect size (*latent d*; Hancock, 2001). Finally, we estimated an MG-SEM model that placed unidirectional paths between timepoints (e.g., Time 1 predicting Time 2) and allowed these structural (beta) pathways to be freely estimated across groups. We then constrained these structural paths to be the same across groups and conducted a chi-square difference test to determine whether this constraint was tenable.

Results

The purpose of the present analyses was to examine the impact of the SDLMI on student self-determination when implemented in inclusive secondary core content classrooms as a Tier 1 intervention. We identified that a single-factor model best represented self-determination due to the high intercorrelations between the three essential characteristics across timepoints (i.e., beginning, middle, and end of the academic year), ranging from .940 to .988. This finding aligned with previous research suggesting a strong relationship between the three essential characteristics (Raley et al., 2019). All subsequent models used a single-factor solution.

RQ1: Change in Student Self-Determination Across an Academic Year

Table 2 provides overall descriptive statistics across measurement timepoints and groups of students with and without disabilities. A cursory examination of the SDI:SR means across time suggested a small degree of net change across measurement occasions; however, in general, the SDI:SR scores of the full sample decreased from the first timepoint (baseline) to the second timepoint (middle of the year), and then increased again to near baseline levels at the end of the year. These descriptive data suggested the importance of focusing on the variance components inherent in modeling student self-determination across time. As such, we next examined time invariance using longitudinal CFA. The configural model ($\chi^2 = 4{,}768.234$, $df = 1{,}824$) for time invariance demonstrated adequate fit as the RMSEA and SRMR were estimated to be 0.036 and 0.043, respectively; whereas the CFI and TLI were estimated to be 0.909 and 0.898, respectively. As shown in supplemental Table S1, the time measurement invariance models demonstrated weak (i.e., loading) and strong (i.e., intercept) invariance, as the change in CFI was less than 0.01 for each step. However, it is important to note that the CFI and TLI across measurement invariance testing stages did not consistently meet the criteria for acceptable model fit put forth by Hu and Bentler (1999); however, the performance of these fit indices is sensitive to the number of indicators per factor (e.g., Kenny & McCoach, 2003). For this reason, we proceeded with the analysis. Passing time measurement invariance suggested that the same self-determination construct was measured across measurement timepoints (i.e., beginning, middle, and end of the year). Using the most parsimonious (strong invariant) model, we examined the estimated latent means. Relative to Time 1 (fixed to 0.0 for identification purposes), the latent mean at Time 2 was estimated to be −0.207 ($SE = 0.041$, $p < .05$) and at Time 3 was estimated to be −0.07 ($SE = 0.043$, $p = .087$); however, the change in self-determination between Time 1 and Time 2 was found to be negligible, as its latent *d* was estimated to be 0.009.

RQ2: Impact of Disability Status on Student Self-Determination

To explore the moderating impact of disability status on the relationship between SDLMI implementation and self-determination outcomes, the same model from time invariance testing (RQ1) was utilized to assess measurement invariance on the basis of disability status. The configural model for the two groups demonstrated acceptable model fit when consulting the RMSEA (0.045) and SRMR (0.07), but not the CFI or TLI. Specifically, the CFI and TLI were estimated to be 0.862 and 0.848, respectively. However, we proceeded with testing as this pattern has been observed in the past (e.g., Kenny & McCoach, 2003). The supplemental table demonstrates that weak and strong invariance was established across disability groups and time due to the ΔCFI being less than 0.01. This suggests that the same construct of self-determination was measured across timepoints and students with and without disabilities. When examining latent invariance, we found the omnibus test for the latent variance failed ($\Delta\chi^2 = 13.656$, $\Delta df = 5$, $p < .05$); therefore, we tested whether the latent variance could be constrained by group followed by time. The constraint across groups was found to be tenable ($\Delta\chi^2 = 3.148$, $\Delta df = 3$, $p = .369$). With respect to the latent mean, the omnibus test also failed

Table 3. Invariance Testing of Latent Parameters.

Model	χ^2	*df*	*p*	$\Delta\chi^2$	Δdf	RMSEA	CFI	TLI	SRMR	Tenable?
Variance omnibus	8,527.030	3,853	.018	13.656	5	0.046	0.856	0.846	0.072	No
Group	8,505.751	3,851	.369	3.148	3	0.046	0.856	0.846	0.060	Yes
Time	8,526.212	3,852	.015	12.359	4	0.046	0.856	0.846	0.071	No
Means omnibus	8,536.258	3,853	.001	28.447	5	0.046	0.855	0.845	0.060	No
Group	8,503.720	3,851	.801	1.000	3	0.046	0.856	0.846	0.059	Yes
Time	8,536.172	3,852	.001	27.970	4	0.046	0.855	0.845	0.060	No
Betas omnibus	8,503.609	3,848	.001	—	—	0.046	0.856	0.846	0.059	—
Group	8,508.759	3,851	.253	4.080	3	0.046	0.856	0.846	0.061	Yes

Note. The strong invariance model acted as baseline model for testing variant means between groups. RMSEA = root mean square error approximation; CFI = comparative fit index; SRMR = standardized root mean square residual; TLI = Tucker–Lewis index.

($\Delta\chi^2 = 28.447$, $\Delta df = 5$, $p < .05$); however, when decomposing the means, we found the constraint across groups to be tenable ($\Delta\chi^2 = 1.00$, $\Delta df = 3$, $p = .801$). Therefore, we found no differences based on disability status. Table 3 provides the results of this latent invariance testing. Next, we tested for beta invariance on the basis of disability status. As shown in Table 3, we found that the beta pathways were invariant across groups ($\Delta\chi^2 = 4.080$, $\Delta df = 3$, $p = .253$). Self-determination as measured by the SDI:SR at the beginning of the school year predicted SDI:SR in the middle of the year ($\beta = 0.631$, $p < .0001$), which predicted SDI:SR at the end of the year ($\beta = 0.563$, $p < .000$). Thus, students with and without disabilities did not differ in their self-determination and the pattern of change over time was the same across groups.

Discussion

Previous research has typically measured self-determination at the beginning and end of an academic year (pre-/postassessment; for example, Shogren, Burke, et al., 2019). As such, findings of this study are novel in that they allow for a greater understanding, with three data collection points, of the midyear impacts of self-determination interventions across students with and without disabilities. Findings suggested an interesting pattern. Specifically, although self-determination status at each timepoint predicts self-determination status at a later time point, there are trends in the data that do not suggest a completely linear pattern between occasions. There was a pattern of small decreases in self-determination scores from the beginning to the middle of the year across students with and without disabilities. By the end of the year, however, self-determination scores rose back to near baseline levels. Although these differences are relatively low in their effect sizes when looking at the overall data, they are significant in the multigroup model across students with and without disabilities. As previous research findings have generally suggested no differences in self-determination until at least the second year of intervention with comprehensive interventions such as the SDLMI, the current results suggest that there may be slight, observable changes in student self-determination during the first year of intervention that follow a pattern that might not typically be hypothesized. That is, student self-perceptions of self-determination abilities may show an initial drop after instruction is initiated.

Although more research is needed to explore this pattern, this shift aligns with anecdotal reporting from teachers and students suggesting initiating instruction in self-determination provides students with opportunities to self-reflect and learn more about their abilities to make decisions about their goals (volitional action), engage in actions toward a self-selected goal (agentic action), and enhance their beliefs about their abilities to achieve goals that are important to them (action-control beliefs). As such, beginning a comprehensive self-determination intervention, such as the SDLMI, in inclusive settings may lead to students with and without disabilities recalibrating how they perceive their self-determination abilities. Therefore, the slight decrease in the latent mean at the second timepoint could reflect students learning more about themselves and their self-determination abilities during the first semester of engaging in the SDLMI.

Changes in Self-Determination Over Time

Additional research should further attempt to replicate observed patterns of change in self-determination over time, and explore whether more frequent data collection could further elucidate patterns. Future research should also explore changes in self-determination over longer periods of time and in relation to other indicators of skill acquisition (e.g., goal attainment, academic achievement) in the short and long terms as well as guide implementers in adjusting intervention supports to address students' needs over the course of the academic year. One focus of ongoing analyses in the larger RCT will be replicating these analyses in new student cohorts, as well as exploring relationships between changes in self-determination and other outcomes over time as some students will be followed up to 3 years. However, replication by other research

teams will be critical to advancing knowledge in the field. Ongoing work in this area could lead to recommendations for training implementers (e.g., general and special education teachers) in designing instruction and supports to promote student self-determination throughout a school year. For example, data at baseline and after a student's first time completing the SDLMI intervention (midyear) could be used to identify additional instruction, opportunities, and/or experiences to enhance students' self-determination going into second semester of instruction.

Furthermore, the overall low net change in self-determination across 1 year could be influenced by the relatively short duration and intensity of SDLMI instruction when delivered as a Tier 1 intervention. The recommended instructional time per SDLMI mini lesson in inclusive core content settings are 15 min, twice a week (Shogren, Raley, & Burke, 2019). This is less than other, more intensive applications of the SDLMI when it is delivered in a small group or individual instructional contexts (e.g., Shogren et al., 2012). It is possible that combining Tier 1 instruction with more intensive supports (i.e., Tier 2 or 3 instruction) for students who need those supports could more significantly enhance overall self-determination over time. We did not explore different responses to intervention or clustering in the data, aside from disability, that could inform the need for intensification. However, it may also be that it simply takes time and repeated exposure to opportunities to learn and use self-determination abilities, particularly when instruction begins in high school, to lead to significant changes. This is consistent with theoretical frameworks for the development of self-determination, which suggest it is a developmental process that requires opportunities and experiences to build and practice skills and abilities associated with self-determination (e.g., decision-making, problem-solving; Shogren, Wehmeyer, Palmer, Rifenbark, & Little, 2015) across the life course. Ongoing work is needed to identify best practices around intensifying self-determination instruction, as there has been little integration of efforts to deliver the SDLMI as a Tier 1 alongside Tier 2 or 3 interventions, as needed based on assessment data, as well as on creating opportunities for self-determination opportunities and supports throughout the life course, including in elementary school. Thus, the current findings contribute to the inclusive education research base by suggesting a pattern of change in student self-determination as students with and without disabilities engage in the SDLMI. There is a need to continue this line of research to guide education researchers and educators in promoting outcomes for all students.

Differences in Self-Determination Based on Disability Status

Another interesting finding was that students with and without disabilities did not differ in their self-determination scores at each measurement timepoint. Furthermore, the pattern of change over time was consistent across the two groups, as was the degree to which self-determination status at one time point predicted self-determination status at a later time point. This finding differs from previous research that has suggested disability-related differences in self-reported self-determination at baseline (Shogren, Shaw, et al., 2018). However, it is important to note that this study took place in inclusive classrooms and the majority of the students had relatively low support needs compared with previous research that has utilized the SDLMI in resource and/or self-contained contexts with students with more extensive support needs (Algozzine et al., 2001; Burke et al., 2018). Therefore, future research should examine the benefits of Tier 1 intervention to promote self-determination with a more diverse sample of students with varying levels of support needs in inclusive settings to more robustly explore the moderating impact of disability status and identify ways to intensify instruction as needed. This research would not only advance access to inclusive opportunities for students with more extensive support needs but also be consistent with integrated systems of supports frameworks (Sailor, 2008–2009) and equity-based education (Artiles & Kozleski, 2016).

Limitations and Future Research

Several limitations should be considered when interpreting the results of this study to guide future research. First, although the interactive effect of disability and race/ethnicity on student self-determination scores has been documented (Shogren & Shaw, 2017), this analysis did not examine both disability and race/ethnicity due to the relatively small sample sizes of students with disabilities across diverse racial/ethnic groups. Future research is needed in examining the impact of the SDLMI on student self-determination with a larger sample of students with and without disabilities from diverse racial/ethnic groups as race/ethnicity is rarely considered in existing research (Hagiwara et al., 2017). Second, although a focus of the larger RCT is exploring different types and intensities of implementation supports for general and special education teachers' as they implement the SDLMI (i.e., online vs. online + coaching supports), the small sample size available from the first year of data collection (as the overall study uses a cohort model to phase in schools) precluded analyzing the impact of implementation supports for teachers in the first year. Examining the differential impact of implementation supports is imperative in future work as experts in implementation science posit that the adoption, utilization, and implementation of evidence-based practices in school systems are enhanced with sustained, systematic supports (Fixsen et al., 2005; Odom et al., 2014), and the lack of ability to account for

the different supports provided to teacher implementers may have influenced the findings. Relatedly, exploring how teachers adjusted SDLMI implementation based on the content area (i.e., ELA or science) would provide valuable information for scaling-up implementation across subject areas.

Last, as noted in the Results section, the model fit results from this study did not pass the CFI and TLI criteria for acceptable fit as put forth by Hu and Bentler (1999). However, it is important to note that the simulation conditions that informed the Hu and Bentler (1999) cutoffs do not generalize to the current study. Specifically, self-determination was found to be a single construct with 21 indicators, and in the literature, the pattern we observed (i.e., disagreement between RMSEA and CFI/TLI) has been shown to be a factor of the number of indicators per factor (Kenny & McCoach, 2003). Therefore, we elected to proceed with the analysis.

Conclusion

More work is needed to explore the longitudinal impact of the SDLMI on student self-determination as well as other critical in-school and postschool outcomes when implemented in inclusive, general education classrooms as a Tier 1 intervention. Analyses presented suggest a relatively small change in overall self-determination during the first year of a multiyear intervention, but interesting patterns of change were replicated across students with and without disabilities. Specifically, findings suggest the utility of adding at least a midyear data collection timepoint in future research to allow for more nuanced detection of changes in self-determination, particularly during the first year of instruction in these skills and abilities. Overall, results provide preliminary evidence that the SDLMI can be potentially implemented in general education classrooms as a Tier 1 intervention for all students, leading to similar outcomes for students with and without disabilities. Continuing to consider how to create integrated systems of supports within secondary schools that promote equity-based education (Artiles & Kozleski, 2016), to address complexities with implementing whole-school interventions with fidelity (Sailor, 2008–2009), has implications for interventions to enhance self-determination, shifting the focus to the distribution of evidence-based supports and services to enable *all students* to engage in the learning process and achieve meaningful outcomes.

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Supplemental Material

Supplemental material for this article is available at the *Remedial and Special Education* website along with the online version of this article.

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