

A Randomized-Trial Evaluation of the Effect of Whose Future Is It Anyway? on Self-Determination

Michael L. Wehmeyer¹, Susan B. Palmer¹, Youngsun Lee²,
Kendra Williams-Diehm³, and Karrie Shogren⁴

Abstract

Promoting student involvement in planning has become best practice in the field of transition. Research documents the positive impact of such efforts on greater student involvement. Research also suggests that promoting student involvement results in greater student self-determination, but a causal link has not been established. This study used a randomized-trial, placebo control group design to study the impact of intervention with the Whose Future Is It Anyway? process on self-determination. The authors also examined the impact of intervention on transition knowledge and skills. Results indicated that instruction using the Whose Future Is It Anyway? process resulted in significant, positive differences in self-determination when compared with a placebo-control group and that students who received instruction gained transition knowledge and skills.

Keywords

self-determination, student involvement, Whose Future Is It Anyway?, transition, transition knowledge

Promoting student involvement in educational planning and decision making has become best practice in the field of transition. Research documents the positive impact of efforts to promote student involvement in educational and transition planning on more positive transition outcomes (Martin et al., 2006; Mason, Field, & Sawilowsky, 2004; Test et al., 2004). Test and colleagues (2004), for example, reviewed articles reporting 16 studies designed to evaluate the effects of interventions to promote student involvement and concluded that students across disability categories can become actively involved in the Individualized Education Program (IEP) process and that instruction to promote such involvement results in enhanced student participation in the IEP process.

There are now a number of interventions designed to promote student involvement in educational and transition planning with some evidence of their impact on one or more aspects of student involvement, including the Self-Directed IEP (Martin, Marshall, Maxson, & Jerman, 1993), the Self-Advocacy Strategy (second edition; Van Reusen, Bos, Schumaker, & Deshler, 2002), Whose Future Is It Anyway? (second edition; Wehmeyer et al., 2004), TAKE CHARGE for the Future (Powers et al., 2001), and the NEXT S.T.E.P. Curriculum (second edition; Halpern, Herr, Doren, & Wolf, 2000). Perhaps the strongest evidence to date has been established for the Self-Directed IEP process. Martin et al. (2006) conducted a randomized-trial, control group study of the effectiveness of the Self-Directed IEP program involving

130 secondary students, with observations conducted in 130 IEP meetings. The results showed that involvement in the process significantly increased the percentage of time students talked and started or led their IEP meetings.

Test et al. (2004) observed that although many of the studies they reviewed assessed outcomes other than actual student participation variables, the wide variety of measures used and types of outcomes measured hindered the capacity to come to conclusions about the effect of student involvement efforts on aspects of student behavior, knowledge, or attitudes other than actual participation in educational planning. One of the frequently cited benefits of student involvement in educational planning and decision making has been that such efforts and experiences lead to the enhanced self-determination of adolescents with disabilities. Williams-Diehm, Wehmeyer, Palmer, Soukup, and Garner (2008) studied the differences in level of self-determination between

¹University of Kansas, Lawrence, USA

²Inha University, South Korea

³University of Oklahoma, Norman, USA

⁴University of Illinois at Urbana-Champaign, USA

Corresponding Author:

Michael L. Wehmeyer, University of Kansas, 1200 Sunnyside Ave.,
Room 3136, Lawrence, KS 66045

Email: wehmeyer@ku.edu

276 students with disabilities divided into groups that differed by level of student involvement in the IEP meeting. Multivariate analysis showed significant differences between self-determination scores on the *Arc's Self-Determination Scale* (SDS; Wehmeyer & Kelchner, 1995) and the *AIR Self-Determination Scale* (AIR; Wolman, Campeau, Dubois, Mithaug, & Stolarski, 1994) for students in a high-involvement group versus students in a low-involvement group, indicating that students who were more involved in their meetings were more self-determined. A second multivariate analysis found, though, that students who were more self-determined (two groups, high or low self-determination) were more likely to be involved in their IEP meetings. This replicated findings from Sands, Spencer, Gliner, and Swaim (1999), who showed that one measured component element of self-determined behavior predicted (using structural equation modeling) student involvement in transition-related activities, and both studies suggest a reciprocal relationship between self-determination and student involvement (e.g., greater self-determination leads to greater involvement, but greater involvement also leads to enhanced self-determination).

Despite the presumption that promoting student involvement promotes self-determination, however, few studies have directly examined the effect of interventions to promote student involvement on self-determination—measuring self-determination directly—and none have done so using a research design that would allow for causal attributions of the effects of instruction to promote student involvement on self-determination. Cross, Cooke, Wood, and Test (1999) compared the effects of the McGill Action Planning System person-centered planning process (Vandercook, York, & Forest, 1989) and the ChoiceMaker Choosing Employment Goals curriculum (Marshall, Martin, Maxson, & Jerman, 1997) on self-determination, measured by SDS, and found significant, positive differences in preintervention and postintervention scores for groups receiving either intervention. Zhang (2001) examined the effects of the Next S.T.E.P. Curriculum (Halpern et al., 1997) on the self-determination of high school students with learning disabilities and found that intervention significantly improved the self-determination scores (using SDS) of a treatment group when compared with those of a control group. Test and Neale (2004) examined the effects of teaching four middle school students with emotional and behavioral disabilities to participate in their IEP using The Self-Advocacy Strategy process (Van Reusen, Bos, Schumaker, & Deshler, 1994) and found that students made gains from pretest to posttest for scores on SDS following instruction, although due to the small sample size, results were not statistically significant.

The *Whose Future Is It Anyway?* process (WFA; Wehmeyer et al., 2004) also has some evidence of its efficacy. Wehmeyer and Lawrence (1995) implemented the WFA with 53 high school students with cognitive disabilities and found that students involved with the process showed more positive

perceptions about their capacity to self-direct planning and held more positive expectations for the success of such self-directed planning. Wehmeyer and Lawrence (2008) conducted a national replication of WFA with 290 students with intellectual disability across 21 states, measuring knowledge about transition planning and perceptions of transition planning efficacy preintervention and postintervention. Students involved in the project gained knowledge about transition planning and had significantly more positive perceptions of self-efficacy about transition planning and more positive outcome expectations. Neither of these studies, however, had a control group, and their effects could be explained by other factors, including maturation.

Recently, Lee et al. (in press) conducted a study of the impact of WFA on self-determination, self-efficacy and outcome expectancy for transition planning, and transition planning knowledge and skills for 168 middle school students. The study utilized a randomized-trial, control group with pretest and posttest design, but all students, including the control group, received instruction using the WFA. The students in the control group received such instruction traditionally—self-directed with teacher or adult support for reading difficulties—whereas students in the treatment group received instruction from WFA lessons using a cognitively accessible audio reader, allowing more independent use of the materials. Repeated measures analyses of covariance showed positive, significant changes from preintervention to postintervention scores for all students, both treatment and control, on self-determination scores, self-efficacy and outcome expectancy for transition planning, and skills and knowledge for transition planning. Students in the technology group did, in fact, benefit more than did students who did not have access to technology.

Still, none of these studies has established a causal relationship between intervention with the WFA and the outcome that students are more self-determined. Although Lee et al. (in press) used a randomized-trial, control group design, all students received the WFA intervention at some level, so overall changes in self-determination could not be attributed, causally, to instruction with WFA. The present study sought to remedy this by implementing a randomized-trial, placebo control group study and using repeated measures multivariate analysis of variance to answer the research question, Does intervention with the WFA lead to improvement in the self-determination scores of students with disabilities? We hypothesized that students who received such instruction would benefit, in terms of enhanced self-determination, more than students who received a placebo intervention. Second, we addressed the research question as to whether the impact of the WFA on transition knowledge and skills would differ by age groups (middle vs. high school) by examining changes in transition knowledge and self-determination scores as a function of instruction using the WFA and school grade level. We also examined the impact

Table 1. Demographic Description of Participating Students

Characteristic	Overall Sample		Control Group		Whose Future Group	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender						
Female	177	35.9	58	40.8	119	66.1
Male	316	64.1	84	59.2	232	33.9
Age	<i>X</i> = 16.02	<i>SD</i> = 2.21	<i>X</i> = 16.78	<i>SD</i> = 1.46	<i>X</i> = 15.82	<i>SD</i> = 2.38
Disability						
ADD/ADHD	31	6.3	8	5.6	23	6.6
ED or BD	42	8.5	14	9.9	28	8.0
MR	131	26.6	31	21.8	100	28.5
OHI	28	5.7	6	4.2	22	6.3
Autism	27	5.5	4	2.8	23	6.6
LD	151	30.6	45	31.7	106	30.2
Other	105	16.8	34	23.9	71	14.0
Ethnicity						
Native	5	1.0	0	0.0	5	1.4
Asian	10	2.0	2	1.4	8	2.3
African American	95	19.3	16	11.3	79	22.5
White	288	59.4	83	58.8	205	58.4
Hispanic/White	71	14.4	23	16.2	48	13.7
Hispanic/non-White	18	3.7	13	9.2	5	1.4
Mixed Race	6	1.2	5	2.8	1	0.3
Estimated IQ Level						
Within normal	308	62.5	97	68.3	211	60.1
Mild	102	20.7	23	16.2	79	22.5
Moderate	76	15.4	20	14.1	56	16.0
Severe	7	1.4	2	1.4	5	1.4

ADD/ADHD = Attention Deficit Disorder/Attention Deficit and Hyperactivity Disorder; ED or BD = Emotional Disorders or Behavioral Disorders; MR = Mental Retardation; OHI = Other Health Impairment; LD = Learning Disability; Native = Native American Alaskan Native; Asian = Asian or Pacific Islander. Other includes Speech, Hearing, Vision, Dual Diagnosis (MR/MI), Physical Disability, and Multiple Disability.

of age (middle vs. high school) on self-determination using multiple regression analysis. We hypothesized that students in the high school group would achieve greater gains in both transition knowledge and skills and self-determination than would middle school students but that both groups would improve in both areas.

Method

Participants

Participants were 493 middle or high school students (including students in 18–21 services affiliated with or located on high school campuses) receiving special education services across multiple disability categories in school districts in six states. The majority of students received services under the categorical area of learning disability (31%) or mental retardation (27%), although other disability categories were also represented in the sample, as shown in Table 1. Participants ranged in age from 11.3 to 21.8 years ($M = 16.02$, $SD = 2.21$). Females constituted 35.9% ($n = 177$) of the

sample, and males constituted 64.1% ($n = 316$) of the sample. Female participants ranged in age from 11.3 to 21.8 years ($M = 16.35$, $SD = 2.10$). Male participants ranged in age from 11.7 to 21.8 ($M = 15.85$, $SD = 2.24$). The majority of participants were Caucasian (58.4%), African American (19.3%), or Hispanic (14.4%), although students from other races/ethnicities were also represented in the sample (see Table 1). IQ scores were not available in school records for many of the students, so as described below, the students' primary special education teachers (e.g., responsible for the students' IEPs) were asked to indicate into which level of intelligence the students would best fit: *within normal limits*, *mild intellectual impairment*, *moderate intellectual impairment*, or *severe/profound intellectual impairment*.

This study was one component of a longitudinal study examining the effects of interventions to promote self-determination on students' self-determination (Wehmeyer, Palmer, Shogren, Williams-Diehm, & Soukup, 2010) in which students were randomly assigned to a treatment group (received instruction to promote self-determination) or a control group in which teachers received a placebo intervention to

promote family involvement. Students from this larger sample who were involved in the WFA or who were in the control group in the Wehmeyer et al. (2010) study constituted the sample for this examination of the effect of the WFA. This, however, resulted in the treatment group in this study (e.g., received instruction using WFA; $n = 351$) being twice the size of the control group ($n = 142$). As such, tests for equality of covariance matrices were conducted because of uneven sample sizes, and data are reported according to the outcome of those analyses. Demographic data with regard to the sample, as a whole, and with regard to each treatment group are provided in Table 1.

Procedure

Project personnel contacted school districts, and the 50 districts that agreed to participate identified middle and high school campuses to participate. Each campus was then randomly assigned to an intervention or control group. Because many special educators provide instruction to students across multiple classrooms, and because students may receive instruction from several special education teachers across the course of a day, it was not feasible to assign teachers or individual students to groups, and thus random assignment (without replacement) using a random numbers table, occurred at the campus (e.g., high school or middle school) level. The sample for this study consisted only of those students who received the WFA as part of the larger intervention study or who were in the placebo control group.

After consent and assent to participate were obtained, baseline data were collected, including demographic information about the student and his or her educational experiences, data about two measures of self-determination, and data from a criterion-referenced assessment of transition knowledge and skills, although for the latter (transition knowledge and skills), data were available only for students in the treatment group. Training was then provided, based on the group to which the campus was randomly assigned. Data pertaining to self-determination and (for treatment group students only) transition knowledge were then collected at the end of the school year.

Control group. To minimize attrition typically associated with control groups in educational research, we implemented a placebo-control group intervention in which teachers in the control group received training and ongoing supports pertaining to an intervention not expected to directly affect student scores on dependent variables (student self-determination and transition knowledge)—specifically how to promote active parental involvement in the educational process. This intervention was intended to control for differential effects occurring as a function of the intervention group's receiving training and support from researchers and to provide teachers in the control group something of value for their continued participation and data collection. Then, at the conclusion

of the study, teachers in the control group received training on all intervention group programs.

Intervention group. Teachers on middle or high school campuses randomly assigned to the intervention condition were provided training and support to implement the WFA (second edition; Wehmeyer et al., 2004). Training consisted of a 2-hr overview of the process using PowerPoint and was conducted in person by project staff or via web-based training and covered both the WFA and the measures being used. It should be noted, though, that the WFA was developed to be used by teachers without training from the developers, and there is an extensive coach's manual that accompanies the materials as well. The WFA was developed primarily for secondary-age students with disabilities to promote greater involvement in transition planning. The intervention consists of 36 sessions introducing students to the concept of transition and transition planning and enabling students to self-direct instruction related to (a) self- and disability-awareness, (b) making decisions about transition-related outcomes, (c) identifying and securing community resources to support transition services, (d) writing and evaluating transition goals and objectives, (e) communicating effectively in small groups, and (f) developing skills to become an effective team member, leader, or self-advocate.

The materials are student directed in that they are written for students as end users. The level of support needed by students to complete activities varies a great deal. Some students who have difficulty reading or writing need one-on-one support to progress through the materials; others can complete the process independently. The materials make every effort to ensure that students self-direct the process while at the same time receive the support they need to succeed. For example, although there is a *Coach's Guide* to assist teachers in providing adequate support, the identification of the person to serve as coach is left to the student. Students are instructed to identify a teacher or other person to serve as a coach and to take the *Coach's Guide* to that person. In all cases in which we were aware, the student selected the teacher who had introduced the WFA material to him or her as his or her coach.

Section 1 of WFA (titled *Getting to Know You*) introduces the concept of transition and educational planning, provides information about transition requirements in IDEA, and enables students to identify who has attended past planning meetings, who is required to be present at such meetings, and who they want involved in their planning process. Later in the section, students are introduced to four primary transition outcome areas (employment, community living, postsecondary education, and recreation and leisure). Activities throughout the process focus on these transition outcome areas.

The remainder of the sessions in this first section address the topic of disability and disability awareness. Students are encouraged to identify their unique characteristics, including

their abilities and interests. Participants then identify unique learning needs related to their disabilities. This process begins with a discussion of stereotypes associated with disability and the possible negative impact of such stereotypes. Finally, students identify their unique learning support needs.

The second section (called *Making Decisions*) introduces a decision-making process called DO IT! that students apply to making decisions about the four transition outcome areas. Students learn a simple problem-solving process by working through each step in the process to make a decision about a potential living arrangement and then apply the process to make decisions about the three other transition outcome areas. In the final session in this section, students learn to use the process to give informed consent and apply this specifically to the transition planning meeting.

The third section (called *How to Get What You Need, Sec. 101*) enables students to locate community resources identified in previous planning meetings that are intended to provide supports in each of the transition outcome areas. Students identify such supports, if available, and then gather information about each community resource. Section 4 (called *Goals, Objectives and the Future*) enables learners to apply a set of rules to identify transition-related goals and objectives that are currently on their IEPs or transition planning forms, evaluate these goals based on their own transition interests and abilities, and develop additional goals to take to their next planning meetings. Students learn what goals and objectives are, how they should be written, and ways to track progress on goals and objectives.

The fifth section (*Communication*) introduces effective communication strategies for small group situations such as transition planning meetings. Students work through sessions that introduce different types of communication (verbal, body language, etc.), how to interpret these communicative behaviors, the differences between aggressive and assertive communication, how to effectively negotiate and compromise, when to use persuasion, and other skills that will enable them to be more effective communicators during transition planning meetings. The final session (called *Thank You, Honorable Chairperson*) enables students to learn types and purposes of meetings, steps to holding effective meetings, and roles of the meeting chairperson and team members. Students are encouraged to work with school district personnel to take a meaningful role in planning for and participating in the meetings, including eventually chairing a transition planning meeting.

Fidelity to treatment. Fidelity to treatment for implementation of the interventions was monitored by three types of fidelity measurement (Fixsen, Naoom, Blasé, Friedman, & Wallace, 2005): (a) a context fidelity measure that describes the necessary precursors to high-level performance (e.g., completion of training), (b) a compliance fidelity measure that provides an outline of the core intervention components and their use by a practitioner, and (c) a competence fidelity

measure that illustrates how well the practitioner is performing the core intervention components of an evidence-based program or practice. For the context fidelity indicator, all special education teachers received training from the same group of trainers on the interventions they were to implement. Compliance fidelity was monitored through ongoing support and communication to facilitate teachers' implementation of the interventions. For this, regular notices to announce important agendas and schedules of implementation were sent via email. All teachers and students followed the same procedures regarding implementation of the respective materials or intervention. Competence fidelity was evaluated, as feasible, by reviewing worksheets and written materials completed by the participating students in relation to each of the interventions.

Measures

Data were collected about self-determination using two measures of self-determination, SDS and AIR (described subsequently). These measures were selected because they were standardized, norm-referenced measures of self-determination for which reliability and validity data had been reported with students with disabilities and because previous research (Shogren et al., 2008) had established the relationship between the two measures and we could more confidently interpret outcomes from both measures in light of that established relationship.

SDS. SDS (Wehmeyer & Kelchner, 1995) is a 72-item self-report measure that provides data about self-determination through the measurement of four essential characteristics of self-determined behavior (behavioral autonomy, self-regulation, psychological empowerment, and self-realization) established by Wehmeyer and colleagues (Wehmeyer, Abery, Mithaug, & Stancliffe, 2003). Subscale scores can be calculated for the primary domains (autonomy, self-regulation, psychological empowerment, and self-realization), as can a total self-determination score. A total of 148 points are available on the scale, with higher scores indicating higher levels of self-determination. SDS was developed and normed with 500 adolescents with cognitive disabilities (Wehmeyer, 1996). It was demonstrated to have adequate reliability and validity in the measurement of self-determination for adolescents with cognitive disabilities. Construct validity was determined by multiple means, the first of which was a factor structure analysis. The mean overall score from the norming sample was 97.52 ($SD = 19.43$). The mean score for each subdomain was as follows: autonomy—63.35 ($SD = 15.50$), self-regulation—9.78 ($SD = 4.95$), psychological empowerment—13.28 ($SD = 2.64$), self-realization—11.11 ($SD = 2.25$).

AIR. AIR (Wolman et al., 1994) has three versions—educator, student, and parent versions—each of which measures individual capacity for and opportunity to act in a

self-determined manner. The purposes of this scale are to (a) assess and develop a profile of the student's level of self-determination, (b) identify areas of strength and areas needing improvement, (c) identify specific educational goals and objectives that can be incorporated into the student's IEP, and (d) develop strategies to build the student's capacities and opportunities to become more self-determined and better prepared for a maximally independent adult life.

In this analysis, data about the AIR-Student version were collected. Capacity and opportunity subscale scores can be calculated, as can a total self-determination score, which is the sum of the capacity and opportunity subscales. The capacity subscale consists of questions pertaining to things students do related to self-determination ("Things I Do" subscale) and how students feel about performing these self-determined behaviors ("How I Feel" subscale). The opportunity subscale consists of questions regarding students' perceptions of their opportunities to perform self-determined behaviors at home and at school. AIR-Student consisted of 18 questions rated on a scale from 1 (*never*) to 5 (*always*).

AIR was developed and normed with 450 students with and without disabilities and their teachers in California and New York (Wolman et al., 1994). All versions of the scale were demonstrated to have adequate reliability and validity in the measurement of self-determination for students with and without disabilities.

Transition knowledge and skills. To measure knowledge about transition planning and the degree to which students benefited from instruction utilizing the WFA, the *Whose Future Is It Anyway—Knowledge Test* (Wehmeyer & Lawrence, 1995), a criterion-referenced assessment of knowledge presented in the WFA was administered prior to and after instruction. The assessment contains a total of 28 questions, 8 of which are open-ended questions pertaining to the degree to which students had previously participated in IEP meetings and knew about their IEP goals. The remaining 20 questions asked students to select one best answer from four possible answer options for each question. Questions were taken directly from lessons in the WFA. Students are awarded 1 point if they select the correct answer and 0 points if they do not. Five points were given to the correct answers and 0 points were given to the incorrect answers; therefore, possible scores ranged from 0 to 100.

Analysis

Given that data about students in two groups were collected at two points in time, repeated measures analyses were used to address our research questions. Specifically, because we had multiple dependent measures, a repeated measures MANCOVA was conducted to determine the differences between groups (treatment vs. control) on AIR-Student and SDS. A second MANCOVA was conducted for students in the WFA treatment group only, examining differences

within students, both overall and by age group (middle school vs. high school), on these same measures of self-determination and on transition knowledge and skills. Because the placebo control group did not complete the transition knowledge and skills measure, this latter comparison does not have a control group and thus cannot establish a causal relationship between intervention and knowledge and skills outcomes. Also, because students involved in the study varied widely as a function of disability category, we felt that level of intellectual capacity would be a factor in explaining changes in level of self-determination and transition knowledge and skills, and as such teachers' classification of students' levels of intellectual capacity (i.e., *within normal limits*, *mild intellectual impairment*, *moderate intellectual impairment*, or *severe/profound intellectual impairment*) was included as a covariate in this analysis. In addition, we hypothesized that the more time special educators spent with their students (direct supervision), the more likely work related to self-determination and transition planning would occur, and to control for this, we entered as a covariate a teacher-identified amount of time spent with a student per day (ranging from *no time spent* to *all day*).

As a means to further examine the impact of student age on self-determination, we conducted regression analyses using total scores for each self-determination scale by age group (middle vs. high school) as the dependent variable and age, gender, level of IQ, and hours spent with nondisabled peers as predictor variables.

Results

In this sample, the test for homogeneity of dispersion matrices was significant, Box's $M = 67.65$, $F(10, 349713) = 6.69$, $p < .001$. If sample sizes are unequal and Box's M is significant at $p < .001$, then robustness is not guaranteed (Tabachnick & Fidell, 2001). In such cases, there may be severe distortion in the alpha levels of the tests, and one should use only Pillai's Trace statistic. As such, all analyses report Pillai's Trace findings.

Effect of WFA on Student Self-Determination

Raw mean scores and standard deviations for each measure across the treatment groups are presented in Table 2. The repeated measures MANCOVA to examine the effect of intervention with the WFA on student self-determination for both dependent variables (AIR-Student, SDS) with time as the within-subject factor, treatment group (placebo control group or WFA group) as the between-subjects factor, and level of capacity and teacher time as covariates yielded significant main effect differences, Pillai's Trace = .868, $F(2, 488) = 1603.3$, $p < .001$, and significant differences based on treatment group, Pillai's Trace = .124, $F(2, 488) = 34.41$,

Table 2. Self-Determination Means and Standard Deviations by Time and Group

Measurement Time/Instrument	Placebo Control Group		Whose Future Group	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Time 1				
SDS	98.25	17.31	91.48	20.45
AIR	72.14	10.42	77.21	15.63
Time 2				
SDS	103.10	19.11	96.52	20.68
AIR	71.92	10.70	79.71	15.95

Table 3. Results From Univariate Repeated Measures ANCOVAs for First Analysis

Source	Measure	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Significance
Time	SDS	1233.85	1	1233.85	8.03	.005
	AIR	344.04	1	344.04	4.916	.02
Time × Group	SDS	6.24	1	0.04	.84	.05
	AIR	435.68	1	435.68	6.22	.013
Error (time)	SDS	75097.50	489	153.57		
	AIR	34224.98	489	69.90		

SDS = Arc's Self-Determination Scale; AIR = AIR Self-Determination Scale—Student Version.

$p < .001$, partial $\eta^2 = .124$. There was no significant effect for the direct supervision covariate, but there was, as might be expected, for the level of IQ covariate, Pillai's Trace = .046, $F(2, 488) = 11.65$, $p < .001$, partial $\eta^2 = .046$. There were significant within-subject effects for time, Pillai's Trace = .02, $F(2, 488) = 5.25$, $p < .001$, partial $\eta^2 = .021$; no significant within-subject effects for time by IQ level or direct supervision; but a significant effect for the Time × Treatment interaction, Pillai's Trace = .013, $F(2, 488) = 3.191$, $p < .042$, partial $\eta^2 = .013$.

Univariate analyses of covariance were used to follow up on the significant multivariate interactions. After adjustment for the covariates, there were significant time effects for SDS, $F(1, 492) = 8.03$, $p < .005$, and AIR, $F(1, 492) = 4.92$, $p < .03$, as well as a significant Time × Treatment Group effects for AIR, $F(1, 492) = 6.22$, $p < .01$. No significant effects were found for Time × Direct Supervision or level of IQ effects. Table 3 provides results from the univariate repeated measures ANCOVAs for this analysis.

Effect of WFA by Grade Level

For the repeated measures MANCOVA for students who received instruction to promote student involvement using the WFA with self-determination and transition knowledge dependent variables, time as the within-subject factor, age group (middle school vs. high school) as the between-subjects factor, and level of capacity and teacher time as covariates,

the test for homogeneity of dispersion matrices was again significant, Box's $M = 136.72$, $F(21, 402688) = 6.38$, $p < .001$, and as such, only Pillai's Trace statistics will be used. Raw mean scores and standard deviations for each measure across the age groups are presented in Table 4. Multivariate analyses yielded significant main effects between subjects, Pillai's Trace = .885, $F(3, 327) = 836.64$, $p < .001$, and significant differences based on age group, Pillai's Trace = .407, $F(3, 327) = 74.74$, $p < .001$, partial $\eta^2 = .407$. There was no significant effect for the direct supervision covariate, but there was, again, a significant effect for the level of IQ covariate, Pillai's Trace = .198, $F(3, 327) = 26.98$, $p < .001$, partial $\eta^2 = .198$. There were significant within-subject effects for time, Pillai's Trace = .056, $F(3, 327) = 6.48$, $p < .001$, partial $\eta^2 = .056$, no significant within-subject effects for time by IQ level or direct supervision, but a significant effect for the Time × Age Group interaction, Pillai's Trace = .06, $F(3, 327) = 7.75$, $p < .001$, partial $\eta^2 = .066$.

Univariate analyses of covariance were used to follow up on the significant multivariate interactions. After adjustment for the covariates, there were significant time effects for Whose Future Knowledge and Skills Assessment, $F(1, 332) = 13.15$, $p < .001$, and AIR, $F(1, 332) = 7.42$, $p < .007$, but no significant Time × Age Group effects for any measure. Table 5 provides results from the univariate repeated measures ANCOVAs for this analysis.

With regard to regression analyses by measure and school level, Table 6 provides coefficient statistics for each of the

Table 4. Self-Determination Means and Standard Deviations by Time and Age Group

	Middle School Group		High School Group	
	M	SD	M	SD
Time 1				
SDS	89.98	19.62	93.35	20.71
AIR	84.25	17.02	70.78	10.67
WF	61.60	15.93	68.24	19.64
Time 2				
SDS	94.32	21.18	98.99	19.78
AIR	87.25	17.33	72.77	10.69
WF	74.07	14.10	71.12	19.08

SDS = Arc's Self-Determination Scale; AIR = AIR Self-Determination Scale—Student Version; WF = Whose Future Transition Knowledge assessment.

Table 5. Results From Univariate Repeated Measures ANCOVAs for Second Analysis

Source	Measure	Type III Sum of Squares	df	Mean Square	F	Significance
Time	SDS	165.00	1	165.00	1.14	.280
	AIR	521.86	1	521.86	7.42	.007
	WF	1661.01	1	1661.01	13.16	.001
Time × Age Group	SDS	22.71	1	22.71	0.16	.692
	AIR	0.43	1	0.43	0.01	.938
	WF	2867.54	1	2867.54	22.72	.001
Error (time)	SDS	211336.34	329	642.46		
	AIR	112584.78	329	342.20		
	WF	126487.19	329	384.46		

SDS = Arc's Self-Determination Scale; AIR = AIR Self-Determination Scale—Student Version; WF = Whose Future Transition Knowledge assessment.

six analyses (SDS as the dependent variable for all students, students in high school, and students in middle school; AIR as the dependent variable for all students, students in high school, and students in middle school). Age contributed significantly to the regression model for SDS only for the sample as a whole and contributed significantly to models predicting the AIR total score for total and high school samples. Gender contributed significantly to the model in each analysis. Level of IQ was a significant contributor on SDS for all samples but only on the high school group for AIR. Finally, hours spent with peers contributed significantly to the model predicting SDS for the total sample and the high school sample but not at all for models predicting AIR.

Discussion

This study provides causal evidence of the efficacy of the WFA intervention to promote the self-determination of students with disabilities. Before considering these findings, however, it is important to note the limitations of the study. First, we did not measure fidelity to treatment, either for the placebo control group or for the WFA group, in a manner that allowed us to fully control for that factor's potential effect. We did contact teachers from both groups frequently

to ask about implementation issues; that and the fact that we used random assignment to groups and included as a covariate the time a student was under a special educator's direct supervision mitigates, we suggest, the potential effects of this issue on outcomes, but we cannot entirely eliminate the possibility that effects are affected by issues of fidelity to treatment. That said, the only potential impact on outcomes we can envision from issues with fidelity to treatment would be detrimental to student progress with regard to transition knowledge or self-determination. Also, with regard to limitations, although we assigned students to either an experimental or a control group randomly, random assignment occurred at the campus level, and each student (as a participant) was nested within teacher, school, and school district. The study would have been stronger had the randomization occurred at the teacher or student level, but as indicated in the Method section, that was not possible in this study.

The results indicate that all students showed gains in self-determination over time for both measures of self-determination (main effect for time only), whereas students in the WFA group scored significantly more positively on AIR than did students in the placebo control group. That the students in the WFA group showed disproportionately positive gains on one measure of self-determination documents

Table 6. Coefficient Statistics for Regression Analysis by Measure and School Level

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Standard Error	Beta		
Dependent variable: all students on SDS, $R = .327, F(4, 632) = 18.92, p = .0001$					
(Constant)	58.89	7.96		7.40	.000
Age	1.68	0.40	0.18	4.20	.000
Gender	6.60	1.58	1.58	4.18	.000
Level of IQ	-6.51	1.13	-2.57	-5.76	.000
Hours with peers	2.46	0.90	0.12	2.75	.000
Dependent variable: all students on AIR, $R = .273, F(4, 636) = 12.85, p = .0001$					
(Constant)	99.23	5.64		17.60	.000
Age	-1.74	0.28	-0.27	-6.17	.000
Gender	0.87	1.12	0.03	0.78	.435
Level of IQ	0.43	0.79	0.03	0.54	.587
Hours with peers	0.62	0.64	0.04	0.97	.333
Dependent variable: high school students on SDS, $R = .339, F(4, 464) = 15.03, p = .0001$					
(Constant)	75.55	12.54		6.02	.000
Age	0.82	0.68	0.06	1.22	.225
Gender	5.92	1.80	0.14	3.28	.001
Level of IQ	-6.43	1.31	-0.26	-4.91	.000
Hours with peers	2.32	0.97	0.12	2.39	.017
Dependent variable: high school students on AIR, $R = .160, F(4, 468) = 3.08, p = .016$					
(Constant)	51.19	7.14		7.17	.000
Age	1.12	0.38	0.16	3.05	.002
Gender	0.48	1.02	0.02	0.47	.636
Level of IQ	-1.63	0.73	-0.13	-2.23	.026
Hours with peers	0.51	0.55	0.05	0.92	.360
Dependent variable: middle school students on SDS ($R = .239, F(4, 163) = 2.46, p = .05$)					
(Constant)	57.97	27.39		2.12	.036
Age	1.30	1.84	0.06	0.70	.483
Gender	7.40	3.41	0.17	2.17	.031
Level of IQ	-4.95	2.50	-0.16	-1.98	.049
Hours with peers	2.94	2.51	0.09	1.17	.243
Dependent variable: middle school students on AIR, $R = .238, F(4, 163) = 2.44, p = .05$					
(Constant)	43.32	23.77		1.82	.070
Age	2.43	1.60	0.12	1.52	.131
Gender	7.07	2.96	0.18	2.39	.018
Level of IQ	1.24	2.17	0.05	0.57	.567
Hours with peers	-0.66	2.18	-0.02	-0.30	.761

SDS = *Arc's Self-Determination Scale*; Level of IQ = teacher estimate of approximate IQ level (within normal range, mild, moderate, severe, profound); Hours with peers = number of hours spent, on average, with nondisabled peers per day; AIR = *AIR Self-Determination Scale—Student Version*.

the causal impact of the intervention, but why this did not happen on both measures is worth consideration. Maturation is a common threat to the internal validity of research examining the impact of interventions, one that is of particular concern in this study. Data from the norming study for SDS (Wehmeyer, 1996) showing that students' total mean self-determination scores increased significantly as a function of age from 15 to 18 years of age was, in fact, used as an indicator of construct validity for that measure. The hypothesis that students will become more self-determined as they age as a

function, at the very least, of greater opportunities seems logical and supported by the Wehmeyer findings. In a recent regression analysis of predictor variables for self-determination, Lee et al. (2010) found that age was not a significant predictor of self-determination scores for middle school students, however. Because the Wehmeyer sample pertained only to students in high school, issues of maturation may be of particular relevance for high school students.

Second, in several studies using both SDS and AIR, we have noted differing results that we have interpreted to reflect

differences in the aspects of self-determination measured by each scale (Lee et al., 2010; Shogren et al., 2008). SDS is a measure of global self-determination; it is a snapshot of a student's overall self-determination at a single point in time. It does not try to parse out why a student is more or less self-determined and, in fact, attempts to account for limited opportunities to engage in self-determined actions by the way in which questions are worded. AIR, on the other hand, is explicitly a measure of opportunity and capacity for self-determination at any given point in time. To some degree, one would expect AIR to be more responsive to changes in capacity and opportunity than SDS, and SDS more responsive to maturational changes. This seems borne out by the patterns of mean scores in this study. For Group \times Time analyses, all students showed gains on SDS, whereas only students in the treatment group showed changes on AIR (preintervention and postintervention scores for the control group on AIR scale differed by only .22 points, so they were essentially static). Regression analyses identified age as a significant predictor for models predicting SDS only for the group as a whole, in which the age range for change was wider. Age was also a significant predictor for AIR for the sample as a whole and for the high school group, but not for the middle school group.

The role of age and maturation in the development of self-determination warrants more explicit examination in future research. In this study, maturation seemed to be a factor contributing to enhanced self-determination for the sample as a whole, and we suggest that the lack of Time \times Group differences on SDS reflects the impact of maturation conflated with intervention effects, given the tendency of SDS to measure global self-determination whereas AIR was able to pick up intervention differences due to its focus on opportunity and capacity instead of just global self-determination.

We would also note that the regression analysis confirms the effect of gender on self-determination. Research examining differences in self-determination by gender has been limited, and the findings are mixed. Wehmeyer and Garner (2003) found no differences on overall self-determination scores by gender for people with disabilities; however, Nota, Ferrari, Soresi, and Wehmeyer (2007) and Shogren et al. (2007) found that gender significantly affected self-determination. Nota and colleagues, with an Italian sample, found that males had higher self-determination scores, and Shogren and colleagues, with an American sample, identified females as having higher self-determination scores. Wehmeyer et al. (in press) suggested that in analyses pertaining to self-determination, gender is probably a proxy for the cultural issues pertaining to gender roles in given societies. Rousso and Wehmeyer (2000) argued that in most cultures and countries, gender and disability form a "double-jeopardy" for biases and differing expectations that may result in differences in responsibilities and opportunities to self-govern and self-direct, which affects self-determination.

With regard to the impact of intervention with the WFA pertaining to knowledge and skills, there were significant time effects, but no significant Time \times Age Group effects, suggesting that across the board, students in both middle and high school gained knowledge and skills pertaining to transition from their involvement with the WFA. This benefit across middle and high school has been documented previously and suggests that it is not too soon to begin instruction to promote student involvement when students enter middle (or junior high) school, even if graduation is several years away. We would reiterate, however, that this finding cannot be interpreted as reflecting a causal relationship, and although we believe this to be the case, that will require future verification. That said, this study extends the evidence base with regard to the impact of the WFA intervention on transition knowledge and skills. Wehmeyer and Lawrence (2008) examined the impact of intervention with the WFA with 290 students with intellectual disability and found that there were significant differences (using paired-samples *t*-test and chi-square analysis) in knowledge about transition planning for these students. There is a need for research on the effects of interventions to promote student involvement (and on interventions to promote self-determination more globally) on transition skills and knowledge. Test et al. (2004) examined, as part of their review of interventions to promote student involvement, the degree to which these studies used direct measures of skill performance. These authors found 8 (of 16) studies collected data about skill performance, although most such skill performance related to actually running the IEP meeting and not the attainment of transition knowledge and skills. The fact is that the literature relating instruction to promote student involvement in educational planning has limited information about the effect of such interventions on variables other than self-determination or student participation in the IEP meeting and needs to be expanded to include the examination of the effects of such interventions on the attainment of student knowledge and skills related to transition more globally.

Conclusions

This study showed that intervention with the *Whose Future Is It Anyway?* curriculum for middle and high school students with disabilities had a causal, positive effect on student self-determination and that students who received instruction from teachers using the WFA showed improved self-determination and transition knowledge and skills across both middle and high school. The establishment of a causal relationship between efforts to promote student involvement and more positive student self-determination extends previous studies that suggested, though could not for methodological or design reasons, confirm that causal relationship. The linkage between intervention to promote student involvement and explicit transition knowledge and skills

also extends the current literature pertaining to the effects of interventions to promote student involvement. There is a need for more research that can provide causal attributions between efforts to promote student involvement and their effect on dependent variables such as self-determination and transition knowledge and skills, but the present study builds on previous research and further establishes an evidence base for the importance of not only the WFA but the role of interventions to promote student involvement in general.

Authors' Note

The contents of this article do not necessarily represent the policy of the Department of Education, and endorsement by the federal government should not be assumed.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

Financial Disclosure/Funding

The author(s) disclosed receipt of the following financial support for the research and/or authorship of this article: Funding for this research was provided by Grant PR Award No. H133A031727 from the U.S. Department of Education, National Institute on Disability and Rehabilitation Research awarded to the University of Kansas and Grant PR Award No. R324B070159 from the U.S. Department of Education, Institute of Education Sciences, National Center for Special Education Research, also awarded to the University of Kansas.

References

- Cross, T., Cooke, N. L., Wood, W. W., & Test, D. W. (1999). Comparison of the effects of MAPS and ChoiceMaker on student self-determination skills. *Education and Training in Mental Retardation and Developmental Disabilities, 34*, 499–510.
- Fixsen, D. L., Naoom, S. F., Blasé, K. A., Friedman, R. M., & Wallace, F. (2005). *Implementation research: A synthesis of the literature*. Tampa: University of South Florida.
- Halpern, A. S., Herr, C. M., Doren, B., & Wolf, N. K. (2000). *NEXT S.T.E.P.: Student transition and educational planning* (2nd ed.). Austin, TX: Pro-Ed.
- Halpern, A. S., Herr, C. M., Wolf, N. K., Doren, B., Johnson, M. D., & Lawson, J. D. (1997). *NEXT S.T.E.P.: Student transition and educational planning*. Austin, TX: Pro-Ed.
- Lee, Y., Wehmeyer, M., Palmer, S., Williams-Diehm, K., Davies, D., & Stock, S. (2010). *Examining individual and instruction-related predictors of the self-determination of students with disabilities: Multiple regression analysis*. Manuscript submitted for publication.
- Lee, Y., Wehmeyer, M., Palmer, S., Williams-Diehm, K., Davies, D., & Stock, S. (in press). The effect of student-directed transition planning using a computer-based reading support program on the self-determination of students with disabilities. *Journal of Special Education*.
- Martin, J. E., Marshall, L., Maxson, L. L., & Jerman, P. (1993). *Self-directed IEP*. Longmont, CO: Sopris West.
- Martin, J. E., Van Dycke, J., Christense, W. R., Greene, B. A., Gardner, J. E., & Lovett, D. L. (2006). Increasing student participation in IEP meetings: Establishing the self-directed IEP as an evidence-based practice. *Exceptional Children, 72*, 299–316.
- Marshall, L.H., Martin, J.E., Maxson, L., & Jerman, P. (1997). *Choosing employment goals*. Longmont, CO: Sopris West.
- Mason, C., Field, S., & Sawilowsky, S. (2004). Implementation of self-determination activities and student participation in IEPs. *Exceptional Children, 70*, 441–451.
- Nota, L., Ferreri, L., Soresi, S., & Wehmeyer, M. L. (2007). Self-determination, social abilities, and the quality of life of people with intellectual disabilities. *Journal of Intellectual Disability Research, 51*, 850–865.
- Powers, L. E., Turner, A., Westwood, D., Matuszewski, J., Wilson, R., & Phillips, A. (2001). TAKE CHARGE for the Future: A controlled field-test of a model to promote student involvement in transition planning. *Career Development for Exceptional Individuals, 24*(1), 89–103.
- Rouso, H., & Wehmeyer, M. L. (2000). *Double jeopardy: Gender equity in special education*. Albany, NY: SUNY Press.
- Sands, D., Spencer, K., Gliner, J., & Swaim, R. (1999). Structural equation modeling of student involvement in transition-related actions: The path of least resistance. *Focus on Autism and Other Developmental Disabilities, 14*, 17–27.
- Shogren, K. A., Wehmeyer, M. L., Palmer, S. B., Soukup, J. H., Little, T., Garner, N., & Lawrence, M. (2008). Understanding the construct of self-determination: Examining the relationship between The Arc's Self-Determination Scale and the American Institute for Research Self-Determination Scale. *Assessment for Effective Instruction, 33*, 94–107.
- Shogren, K. A., Wehmeyer, M. L., Palmer, S. B., Soukup, J. H., Little, T. D., Garner, N., & Lawrence, M. (2007). Examining individual and ecological predictors of the self-determination of students with disabilities. *Exceptional Children, 73*, 488–509.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Boston, MA: Allyn & Bacon.
- Test, D. W., Mason, C., Hughes, C., Konrad, M., Neale, M., & Wood, W. M. (2004). Student involvement in individualized education program meetings. *Exceptional Children, 70*, 391–412.
- Test, D. W., & Neale, M. (2004). Using the self-advocacy strategy to increase middle graders' IEP participation. *Journal of Behavioral Education, 13*(2), 135–145.
- Vandercook, T., York, J., & Forest, M. (1989). The McGill Action Planning System (MAPS): A strategy for building the vision. *Journal of the Association for Persons With Severe Handicaps, 14*, 205–215.
- Van Reusen, A. K., Bos, C. S., Schumaker, J. B., & Deshler, D. D. (1994). *The self-advocacy strategy*. Lawrence, KS: Edge Enterprises.

- Van Reusen, A. K., Bos, C. S., Schumaker, J. B., & Deshler, D. D. (2002). *The self-advocacy strategy for enhancing student motivation and self-determination*. Lawrence, KS: Edge Enterprises.
- Wehmeyer, M.L., & Garner, N. W. (2003). The impact of personal characteristics of people with intellectual and developmental disability on self-determination and autonomous functioning. *Journal of Applied Research in Intellectual Disabilities, 16*, 255-265.
- Wehmeyer, M., Lawrence, M., Kelchner, K., Palmer, S., Garner, N., & Soukup, J. (2004). *Whose Future Is It Anyway? A student-directed transition planning process* (2nd ed.). Lawrence, KS: Beach Center on Disability.
- Wehmeyer, M. L. (1996). Student self-report measure of self-determination for students with cognitive disabilities. *Education and Training in Mental Retardation and Developmental Disabilities, 31*, 282-293.
- Wehmeyer, M. L., Abery, B., Mithaug, D. E., & Stancliffe, R. J. (2003). *Theory in self-determination: Foundations for educational practice*. Springfield, IL: Charles C Thomas.
- Wehmeyer, M. L., Abery, B., Zhang, D., Ward, K., Willis, D., Amin, W. H., . . . Walker, H. (in press). Personal self-determination and moderating variables that impact efforts to promote self-determination. *Exceptionality*.
- Wehmeyer, M. L., & Kelchner, K. (1995). *The Arc's Self-Determination Scale*. Arlington, TX: Arc National Headquarters.
- Wehmeyer, M. L., & Lawrence, M. (1995). Whose future is it anyway? Promoting student involvement in transition planning with a student-directed process. *Career Development for Exceptional Individuals, 18*, 69-83.
- Wehmeyer, M. L., & Lawrence, M. (2008). *A national replication of the Whose Future Is It Anyway? process*. Manuscript under review.
- Wehmeyer, M. L., Palmer, S., Shogren, K., Williams-Diehm, K., & Soukup, J. (2010). *Establishing a causal relationship between interventions to promote self-determination and enhanced student self-determination*. Manuscript submitted for publication.
- Williams-Diehm, K., Wehmeyer, M. L., Palmer, S., Soukup, J. H., & Garner, N. (2008). Self-determination and student involvement in transition planning: A multivariate analysis. *Journal on Developmental Disabilities, 14*, 25-36.
- Wolman, J., Campeau, P., Dubois, P., Mithaug, D., & Stolarski, V. (1994). *AIR Self-Determination Scale and user guide*. Palo Alto, CA: American Institute for Research.
- Zhang, D. (2001). The effect of Next S.T.E.P. instruction on the self-determination skills of high school students with learning disabilities. *Career Development for Exceptional Individuals, 24*(2), 121-132.

Bios

Michael L. Wehmeyer, PhD, is a professor of special education, the director of the Kansas University Center on Developmental Disabilities, and a senior scientist at the Beach Center on Disability, all at the University of Kansas. His research focuses on promoting the self-determination of students with disabilities, technology use for students with cognitive disabilities, and access to the general education curriculum for students with severe disabilities.

Susan B. Palmer, PhD, is a Research Associate Professor at the Beach Center on Disability and Kansas University Center on Developmental Disabilities at the University of Kansas. Her research interests include developmental aspects of self-determination and access to the general curriculum.

Youngsun Lee, PhD, is a full-time lecturer of special education in the Department of Education at Inha University, South Korea. Her research interests include self-determination, transition planning, and technology use for secondary students with disabilities.

Kendra Williams-Diehm, PhD, is an assistant professor in the educational psychology department at the University of Oklahoma. Her current interests include transition and self-determination for students with disabilities and from diverse cultural backgrounds.

Karrie Shogren, PhD, is an assistant professor of special education at the University of Illinois at Urbana-Champaign. Her interests include self-determination and strategies to support its development in children and youth with disabilities.