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Impact of Kindergarten Transition Practices in Promoting Positive Behavioral School Readiness Skills

Tyler M. Szydlo and Elyse M. Farnsworth

Abstract

Successfully adjusting to the behavioral demands of kindergarten is a pivotal, yet challenging, developmental milestone for students, making it imperative that schools have a comprehensive menu of universal transition practices and targeted transition interventions available. This systematic review was conducted to synthesize and evaluate the existing research on the outcomes associated with universal transition practices and targeted transition interventions aimed at improving social-emotional behavioral skills important to the transition to kindergarten. 17 studies were identified that met the inclusion criteria. Results from this review highlight the utility of targeting self-regulation skills in students transitioning to kindergarten through multi-component interventions that incorporate caregiver involvement. Limitations, directions for future research, and implications for practice are discussed.

Keywords: kindergarten transition, behavioral intervention, social-emotional supports

Impact of Kindergarten Transition Practices in Promoting Positive Behavioral School Readiness Skills

Successful adjustment to kindergarten is one of the earliest educational milestones for a student (Welchons & McIntyre, 2017). The transition to a formal learning environment introduces new academic and behavioral demands on students, with implications for educational success. Meeting these new demands is critical; research indicates a child's social-emotional behavioral skills in kindergarten, as well as their early school experiences, are key predictors of later school achievement (Cook & Coley, 2017; Rimm-

Kaufman et al., 2000). Still, many children struggle with this transition. Adjusting to the new behavioral demands of formal schooling may be especially profound for students who enter kindergarten already at-risk (Duncan et al., 2018; Eisenhower et al., 2016). Therefore, it is vital that there is a continuum of services available to support students preparing for and currently transitioning to kindergarten.

Challenges Associated with Kindergarten Transition

The transition to kindergarten can be especially challenging as students experience a multitude of changes concurrently (Purtell et al., 2020). In addition to formalized academic demands, kindergarten students must adapt to new social, emotional, and behavioral demands introduced in the school environment. These include social interaction expectations with adults, cooperation with peers, increased independence, compliance with new routines, and increased attentional demands (Purtell et al., 2020; Rimm-Kaufman & Pianta, 2000).

Given the significant changes in behavioral expectations in kindergarten relative to preschool and the home environment, it is not surprising that many students struggle with this transition. Kindergarten teachers reported that 16% of students had severe adjustment problems, and 46% of teachers reported that up to half of their class displayed behavior problems (Rimm-Kaufman et al., 2000). Among the most common behavioral difficulties at school entry were difficulty following directions and working in a group, and increased externalizing issues such as defiance, aggression, and hyperactivity (Hart et al., 2016; Rimm-Kaufman et al., 2000). It is vital that schools identify and support students who struggle with the transition to kindergarten. Without effective strategies, these behavioral challenges may persist and result in elevated risk of low achievement, school failure, mental health problems, and substance abuse (Eisenhower et al., 2016; Garbacz et al., 2020; Hart et al., 2016).

The transition to kindergarten is even more challenging for students with elevated levels of risk of poor adjustment (e.g., students with disabilities, with no preschool experience, who are involved in the child welfare system, who live in low-income households, and who displayed externalizing issues in preschool; Duncan et al., 2018; Eisenhower et al., 2016; Hart et al., 2016; Mistry et al., 2008; Pears et al., 2013; Welchons & McIntyre, 2017). It is imperative that educators meet students where they are, by providing universal and targeted interventions to ease the transition to kindergarten, thus creating a foundation for future success.

Core Components of School Readiness

Whereas preschool and early education centers are characterized by developmental and play-based approaches, entry into kindergarten often signifies a student's first experience with a formal learning environment (Welchons & McIntyre, 2017). Research suggests certain skills are vital for school readiness and a successful transition (Duncan et al., 2018; McClelland & Cameron, 2012; Pears et al., 2013). These necessary academic and behavioral skills allow students to better interact with their new environment and learn new skills (Duncan et al., 2007). For example, understanding number magnitude and relationships, phonological awareness, letter-sound knowledge, letter identification, and print concepts are some of the strongest predictors of later school outcomes and achievement (Duncan et al., 2018; Pears et al., 2013).

Academic skills, while important, only comprise one part of school readiness. Kindergarten introduces new behavioral demands on students, such as working independently, remaining on-task, and forming healthy relationships. Students must be able to meet these behavioral demands to engage in and benefit from academic instruction (Welchons & McIntyre, 2017). Key behavioral skills relevant to school readiness can be grouped into two related competencies: prosocial behaviors and self-regulation (Blair, 2002).

Prosocial behaviors are interpersonal behaviors that are exhibited to benefit others (Collie et al., 2018; Schmidt et al., 2002) and facilitate sharing, cooperation, group work, and interpretation of emotions (Pears et al., 2013). Not only do improved prosocial behavior skills allow for more success in developing positive attitudes about school, but they are also associated with improved achievement later in school (Denham, 2006; Nix et al., 2013). Perhaps prosocial behaviors allow students to better participate in collaborative learning experiences, cultivate positive relationships with teachers and peers, and promote a positive classroom environment (Collie et al., 2018; Nix et al., 2013).

Engaging in self-regulatory behaviors also fosters a positive transition to kindergarten. Self-regulation is a multidimensional set of skills, including the ability to regulate and direct attention, emotions, thoughts, and behaviors in order to act in a goal-oriented manner (Duncan et al., 2018; McClelland & Cameron, 2012; Pears et al., 2013). Successful self-regulation is reliant on three skills central to executive function: attentional flexibility, working memory, and inhibitory control (Blair et al., 2005). Together, these processes comprise self-regulation and enable students to meet the demands of common educational tasks like raising a hand instead of shouting, focusing on a project, persisting through difficult tasks, remembering classroom rules, following instructions, and transitioning between activities (Duncan et al., 2018; McClelland & Cameron, 2012). The integration of these skills is a robust predictor of academic engagement and success (Brock et al., 2009; McClelland & Cameron, 2012; Pears et al., 2013).

The Dynamic Effects Model of Transition and the Use of Transition Interventions

The most widely accepted model of school transition, the Dynamic Effects Model (DEM), is an ecological-based, developmental model that emphasizes the interconnectedness of the child, their family, their preschool and school, peers, and community factors

(LoCasale-Crouch et al., 2008; Rimm-Kaufman & Pianta, 2000). A central tenet of this model is the development of relationships over time to facilitate a successful school transition. The DEM posits that interactions between these factors form relationships between individuals in the student's different environments which strongly affect student development (Rimm-Kaufman & Pianta, 2000). When there is alignment, high quality relationships are produced that help support the student through the kindergarten transition. Further, the transition process begins in the year prior to kindergarten and continues through kindergarten (Rimm-Kaufman & Pianta, 2000).

Based on the DEM, schools can best support students' behavioral adjustment to school when they utilize transition practices that intervene early, promote healthy relationships, and are implemented across environments (Berlin et al., 2011; Cook & Coley, 2017; LoCasale-Crouch et al., 2008). However, the most commonly used transition strategies are informal and tend not to start until the child has entered kindergarten (e.g., sending brochures home and hosting open houses; Berlin et al., 2011; Cook & Coley, 2017; Rimm-Kaufman et al., 2000).

Students are more likely to benefit from proactive universal and targeted transition interventions that engage parents and other key stakeholders (Berlin et al., 2011; LoCasale-Crouch et al., 2008). Transition interventions that are implemented across settings and that utilize more personalized components such as home visits, communication between preschool and kindergarten teachers, parent education, and relationship building have the potential to significantly improve the kindergarten transition, facilitating positive behavioral adjustment, especially for at-risk students (Berlin et al., 2011; Eisenhower et al., 2016; Garbacz et al., 2020).

Present Study

Following the tenets of the DEM, students preparing for and currently transitioning to kindergarten should be provided with transition supports that are comprehensive, ecologically based,

and facilitate high quality relationships between students, parents, and teachers. In order to be able to meet the needs of all students, schools need information about multi-tiered services with the greatest impact on behavioral outcomes during the kindergarten transition. Therefore, the purpose of the present review is to synthesize the existing evidence on the outcomes associated with the use of universal and targeted transition interventions to promote positive behavioral functioning during the kindergarten transition, by addressing two questions:

1. *To what extent do universal transition practices promote positive behavior and school adjustment among students preparing for or currently transitioning to kindergarten?*
2. *To what extent do targeted transition interventions promote positive behavior and school adjustment among students preparing for or currently transitioning to kindergarten?*

Method

Literature Search Procedure

A comprehensive search of the literature was conducted in the Education Source and Educational Resources Information Center (ERIC) databases using the following terms in the title, abstract, and key word indicators: "kindergarten," "transition," "school entry," "school readiness," "school adjustment," "kindergarten entry," "kindergarten readiness," "kindergarten adjustment," "behavior," and "self-regulation." The search produced 703 hits, and data were extracted into Zotero to remove duplicates. A total of 577 unique records remained.

Inclusion Criteria and Quality Assessment

These 577 records were uploaded into Rayyan (see Ouzzani et al., 2016) for screening. Studies had to meet the following inclusion criteria: (a) be published in a peer-reviewed journal, (b) be conducted in the United States, (c) utilize a randomized controlled trial methodology, a quasi-experimental design, or single-case

experimental design, (d) include an intervention designed to improve student behavioral readiness for kindergarten, (e) include outcome measures that assess students' behavioral readiness skills or level of kindergarten adjustment, (f) participants were in preschool, kindergarten, parents of children in these grades, teachers of children in these grades, or a combination of these groups, and (g) interventions were conducted in school, home, or the community.

After reviewing titles and abstracts for relevancy, the full text was reviewed for 40 articles. Seventeen studies met the inclusion criteria and were included in the final review. The most common reason for exclusion was studies not meeting the criteria for study design. A detailed list of the studies that were excluded and for what reasons can be seen in Figure 1.

Prior to coding study characteristics, studies were appraised for methodological quality and risk of bias using the JBI Checklist for Randomized Controlled Trials (Tufanaru et al., 2020), JBI Checklist for Quasi-Experimental Studies (Tufanaru et al., 2020), and the WWC Standards for Single-Case Designs (Kratochwill et al., 2010). Given the inclusion of studies with various designs, studies were critically appraised focusing on their methodology. Each tool consisted of criteria related to its respective study design as well as a rating system for assessing whether each study met the criteria. No studies were excluded from the review based on poor quality; study quality was considered during the interpretation and discussion of results.

Analysis of Included Studies

Studies that met the inclusion criteria were coded with a protocol created by the authors. Data extraction included study and intervention variables. Study variables included design type, location (i.e., urbanicity, state, and/or census region), sample size, participant demographics (i.e., age of students, race/ethnicity, and biological sex or gender), student risk status (i.e., participants with elevated risk, participants with no risk, or participants from both

risk groups), measurement tools, and outcomes (i.e., impact on behavioral functioning, prosocial behavior, self-regulation skills, student-teacher relationships, and/or on-task behavior). Notably, if groups previously identified in the empirical literature as experiencing elevated risk (e.g., students with disabilities, with no prior preschool experience, etc.) were included in the study sample, the risk status was coded as elevated risk. Intervention variables included intervention type (i.e., manualized program; universal/targeted practice), participants (i.e., students, families, educators, or multiple groups), duration (i.e., how long the intervention was implemented), and delivery context (i.e., home, school, community, or home/school combined).

Due to variability in study methodology, quantitative analysis was not applied. Narrative discussion and qualitative interpretation were used. Studies were initially categorized by transition practice characteristics: universal practices or targeted interventions. Studies that reported targeted interventions were further categorized dependent on the behavioral skills targeted.

Second Coder Procedure and Interrater Agreement

An Educational Psychology graduate student served as a secondary coder and was trained by the authors to apply the inclusion criteria and coding procedures during a one-hour meeting. The additional coder reviewed the abstracts and titles of 30% of the total articles. Initial interrater agreement between the authors and the second coder was 55%, with the most common discrepancy involving disagreements on the behavioral outcome inclusion criterion. All discrepancies were resolved through discussion and review of the inclusion criteria during a follow-up, one-hour session. Following this session, interrater agreement was 100%.

Results

The participant and intervention context characteristics are described in Table 1, and intervention descriptions and participant outcomes are provided in Table 2.

Participant and Setting Characteristics

Total participants (N = 2,893) represented diverse racial and ethnic backgrounds and were conducted in kindergarten classrooms, preschool classrooms, Head Start classrooms, and community centers. Participants ranged from age 4 to 6 years and came from 5 different United States regions, representing both urban and rural areas. One study (Hains, 1992) did not provide information on study location. The majority of participants had elevated risk levels; only one study (i.e., Wenz-Gross et al., 2018) contained a participant sample that included individuals without elevated risk.

Of the 17 studies, five reported interventions conducted exclusively in schools (Duncan et al., 2018; Eisenhower et al., 2016; Hains, 1992; Stormshak et al., 2020; Wenz-Gross et al., 2018), four reported interventions implemented at both school and another educational setting (Bierman et al., 2013; Nix et al., 2013; Hart et al., 2016; Sprague & Perkins, 2009), and the remaining eight reported interventions completely implemented in a community-based settings.

Eight studies reported interventions that were implemented before kindergarten. Four of these studies reported on interventions conducted exclusively during children's preschool year (Bierman et al., 2013; Hains, 1992; Nix et al., 2013; Wenz-Gross et al., 2018), while the other four studies reported interventions conducted during the summer before kindergarten (Duncan et al., 2018; Graziano & Hart, 2016; Hart et al., 2019; McLeod et al., 2017). Four studies reported on interventions that started during kindergarten (Eisenhower et al., 2016; Hart et al., 2019; Sprague & Perkins, 2009; Stormshak et al., 2020). The remaining six studies utilized a developmental approach consistent with the DEM and were implemented during the children's preschool year and continued through kindergarten (Hart et al., 2016, 2019; Lynch et al., 2017; McDermott et al., 2017; Pears et al., 2012, 2013, 2014).

Table 1
Participant Characteristics

Authors	<i>n</i>	Biological Sex of Students	<i>M</i> Age of Students	Racial and Ethnic Identities of Students	Risk Status of Students
Bierman et al. (2013)	356	54% F, 46% M	4.59	25% B, 17% W, 58% O	Elevated Risk
Duncan et al. (2018)	125	Not provided	C: 5.29 I: 5.25	Not provided	Elevated Risk
Eisenhower et al. (2016)	97	26% F, 74% M	5.33	5% A, 3% B, 16% L, 57% W, 16% O	Elevated Risk
Graziano & Hart (2016)	45	24% F, 76% M	5.16	4% B, 84% L, 9% W, 4% O	Elevated Risk
Hains (1992)	11	18% F, 82% M		Not provided	Elevated Risk
Hart et al. (2016)	50	22% F, 78% M	5.08	52% Latino	Elevated Risk
Hart et al. (2019)	45	18% F, 82% M	5.16	93% Latino	Elevated Risk
Lynch et al. (2017)	192	C: 54% F, 46% M I: 48% F, 52% M	5.25	C: 2% AI, 1% B, 30% L, 2% PI, 55% W, 10% O I: 31% L, 51% W, 18% O	Elevated Risk
McDermott et al. (2017)	41	C: 33% F, 67% M I: 15% F, 85% M	C: 5.24 I: 5.26	C: 10% L, 71% W, 19% O I: 15% L, 85% W	Elevated Risk
McLeod et al. (2017)	25	44% F, 56% M	Not provided	100% B	Elevated Risk
Nix et al. (2013)	356	54% F, 46% M	4.59	25% B, 17% L, 58% W	Elevated Risk
Pears et al. (2012)	192	C: 54% F, 46% M I: 48% F, 52% M	C: 5.25 I: 5.26	C: 31% L, 51% W, 18% O I: 2% AI, 1% B, 30% L, 2% PI, 55% W, 10% O	Elevated Risk

Table 1 (continued)

Authors	n	Biological Sex of Students	Mean Age of Students	Racial and Ethnic Identities of Students	Risk Status of Students
Pears et al. (2013)	192	C: 54% F, 46% M I: 48% F, 52% M	C: 5.25 I: 5.26	C: 31% L, 51% W, 18% O I: 2% AI, 1% B, 30% L, 2% PI, 55% W, 10% O	Elevated Risk
Pears et al. (2014)	209	C: 23% F, 77% M I: 23% F, 77% M	C: 5.28 I: 5.26	C: 1% A, 2% AI, 2% B, 14% L, 67% W, 14% O I: 1% A, 1% AI, 1% B, 14% L, 71% W, 12% O	Elevated Risk
Sprague & Perkins (2009)	4	25% F, 75% M	5.4	100% W	Elevated Risk
Stormshak et al. (2020)	365	46% F, 54% M	5.45	2% A, 2% B, 13% L, .3% PI, 59% W, 23% O	Elevated Risk
Wenz-Gross et al. (2018)	972	49% F, 51% M	4.42	26% B, 40% L, 42% W	Elevated Risk

Table 2

Intervention Descriptions and Outcomes

Authors	Design	Groups Targeted	Behavioral Skills	Findings
Bierman et al. (2013)	RCT	Parents, Students	BF, PB, MD	BF: students receiving intervention displayed fewer aggressive behaviors at home and school PB: students receiving intervention displayed improved social-problem solving abilities MD: students receiving the intervention were rated by teachers as more engaged and motivated in kindergarten
Duncan et al. (2018)	RCT	Students	SR	Students receiving the intervention demonstrated significant growth in self-regulation; estimated to be equal to four months of normal development
Eisenhower et al. (2016)	RCT	Parents, Teachers	BF, STR	BF: fewer teacher and parent reported externalizing and internalizing concerns in kindergarten STR: no direct effect of intervention on improved STR quality for all students in the study, but there was an effect for student who had low-quality initial relationships
Graziano & Hart, 2016	RCT	Parents, Students	BF, PB, SR	BF: significant reduction in teacher reported behavior impairment PB: significant increase in emotion knowledge SR: increased executive functioning as measured by objective measures
Hains, 1992	SCD	Students	OTB	Three of the four students receiving intervention displayed increased academic engaged time
Hart et al. (2016)	RCT	Parents, Students	BF, PB, STR	BF: Both high and low intensity versions of intervention resulted in reduced teacher report of behavior problems, but the high intensity version resulted in more rapid improvement PB: no significant effects of high or low intensity intervention on improved prosocial behaviors STR: both versions resulted in reduced conflict with teachers, but the high intensity version displayed greatest reduction

Table 2 (continued)

Author (Year)	Design	Participants	Intervention	Outcomes
Hart et al. (2019)	RCT	Parents, Students	BF, PB, SR	BF: students in both 4W and 8W intervention groups displayed reduced parent reported behavior concerns, but no significant difference between groups PB: students in 8W group displayed greatest growth in emotion knowledge, but results were not maintained at follow-up SR: students in 4W and 8W group both demonstrated significant growth in SR skills, but no difference between groups
Lynch et al. (2017)	RCT	Parents, Students	BF	Students receiving intervention demonstrated significantly more days free of externalizing and internalizing concerns
McDermott et al. (2017)	RCT	Parents, Students	SR	Students receiving intervention displayed enhanced response monitoring time on a series of neural reactivity tasks
McLeod et al. (2017)	QA	Students	PB	Students receiving intervention did not display significant growth in prosocial behavior skills
Nix et al. (2013)	RCT	Parents, Students	PB, MD	PB: gains in prosocial behavior made during Head Start REDI in preschool were maintained through kindergarten MD: growth in behavior skills made during Head Start REDI in preschool were predictive of learning engagement in kindergarten
Pears et al. (2012)	RCT	Parents, Students	BF	Students receiving intervention displayed reduced teacher ratings of aggressive and oppositional behavior
Pears et al. (2013)	RCT	Parents, Students	PB, SR	PB: no direct effect of the intervention on growth in PB SR: students receiving intervention displayed improved SR skills at the end of preschool and were maintained through kindergarten
Pears et al. (2014)	RCT	Parents, Students	SR	Students receiving the intervention displayed significant gains in SR skills by the end of kindergarten

Targeted Domains of Functioning

All studies reported on interventions that aimed to increase social-emotional behavioral readiness skills and promote positive school adjustment. Eleven studies assessed multiple areas of functioning, while the other studies assessed one domain of behavioral readiness. In total, eight studies included measures of behavioral functioning, seven studies included measures of prosocial behavior, six studies included measures of self-regulation skills, three studies included measures of student-teacher relationships, two studies included measures of on-task behavior, and four studies included multi-domain measures of behavioral readiness for kindergarten.

Universal Transition Practices

Notably, only one study reported on a universal transition practice. Wenz-Gross et al. (2018) utilized a cohort randomized trial design to test the effectiveness of The Second Step Early Learning Curriculum (SSEL; Committee for Children, 2011) for promoting behavioral readiness of preschoolers preparing for kindergarten. Wenz-Gross et al. (2018) reported that there was no direct effect of SSEL on overall kindergarten readiness or social-emotional skills, but participation did result in significantly increased executive functioning. Authors noted that a lack of significant effect on social-emotional skills might have been due to concurrent social-emotional skill building in control classrooms.

Targeted and Intensive Transition Interventions

Social-emotional behavioral skills targeted by these interventions included behavioral functioning, prosocial behavior, self-regulation, student-teacher relationships, and on-task behavior, with most interventions targeting multiple skills. Some studies included multi-domain measures of behavioral readiness for school, rating students' capacities across a range of behavioral skills. Most targeted interventions were delivered to both students and parents.

Behavioral Functioning Outcomes

Eight studies included measures of behavioral functioning. Studies varied in how behavioral functioning was defined and assessed, ranging from measures of overall externalizing and internalizing behavior to more focused measures of aggressive, disruptive, and oppositional behaviors. Targeted transition interventions showed a positive impact on improving students' behavioral functioning. For studies reporting effect sizes, effect sizes ranged from -1.34 (Graziano & Hart, 2016) to 0.33 (Pears et al., 2012). Seven studies utilized interventions that were multi-component and included caregiver involvement (Bierman et al., 2013; Graziano & Hart, 2016; Hart et al., 2016; Hart et al., 2019; Lynch et al., 2017; Pears et al., 2012; Sprague & Perkins, 2009). Three studies (Graziano & Hart, 2016; Hart et al., 2016; Hart et al., 2019) reported on the Kindergarten Summer Readiness Classroom (KSRC; see Hart et al., 2010).

Hart et al. (2016) compared a high intensity version of the KSRC to a low intensity version. They reported that students in both groups displayed significant reductions in teacher reported behavior problems, but the high intensity group experienced greater improvement ($d = -0.43$). Similarly, Graziano and Hart (2016) tested the impact of adding 30-minutes of daily self-regulation training to the KSRC. Students receiving the self-regulation enhanced KSRC displayed significant reductions in behavior impairment as rated by their teachers ($d = -1.34$), but the improvement in behavioral functioning was not significantly different from students receiving the traditional KSRC ($d = -0.93$). Further, Hart et al. (2019) attempted to identify the ideal length of the self-regulation enhanced KSRC intervention, comparing a 4-week and 8-week version to traditional school behavioral consultation. Students in both the 4-week and 8-week self-regulation enhanced KSRC displayed significant reductions in behavior problems compared to students receiving school-based consultation on parent reported behavioral functioning, and these reductions were maintained

through follow-up ($d = -0.61$; $d = -0.46$, respectively). However, there was not a significant difference between the 4-week and 8-week groups. Overall, KSRC implementation was associated with moderate to large decreases in externalizing behavior for children at-risk of poor behavioral functioning at kindergarten entry.

Similarly, Kids in Transition to School ([KITS]; see Pears et al., 2018) was associated with positive effects. Pears et al. (2012) assessed the impact of KITS on reducing aggressive and oppositional behaviors and found that teacher ratings of these behaviors at the end of kindergarten were significantly lower for students receiving the intervention compared to students in the control group ($d = 0.33$). The positive impact of KITS is also supported by Lynch et al. (2017), who reported that students receiving the intervention displayed significantly fewer externalizing and internalizing symptoms than those who did not participate in KITS. Similarly, Bierman and colleagues (2013) reviewed Head Start Research-Based, Developmentally Informed (REDI) and reported positive effects, with students who received the intervention displaying fewer aggressive behaviors at home and school one year after the intervention compared to the control group, as measured by both parent and teacher reports ($\beta = -0.26$; $\beta = -0.23$, respectively). In contrast to the previously mentioned interventions, Sprague and Perkins (2009) reviewed First Step to Success (Walker et al., 1998), a targeted transition intervention that begins after students enter kindergarten. The researchers observed that students receiving the First Step to Success intervention demonstrated an immediate reduction in problem behaviors compared to their baseline performance, with the number of problem behaviors observed decreasing by 5.5 instances per day on average. These results were maintained at follow-up.

While the prior interventions have all included direct services to students and caregivers, Starting Strong is an intensive transition intervention that targets parents and teachers rather than students (see Eisenhower et al., 2016). Starting Strong had a positive effect

on student's behaviors with fewer teacher- and parent-reported externalizing and internalizing concerns ($d = -0.19$; $d = -0.35$, respectively; Eisenhower et al., 2016). Findings indicate that participation was associated with small to moderate reductions in problem behaviors.

Collectively, transition interventions targeting behavioral functioning were associated with a range of reductions (small to large) in undesired behaviors. These results were observed for both parent- and teacher-reported behavioral functioning. Most studies included multiple components and caregiver involvement, suggesting these may be important elements of kindergarten transition services for children at-risk of behavioral problems.

Prosocial Behavior Outcomes

Prosocial behavior was another commonly targeted skill, with seven studies addressing this area (Bierman et al., 2013; Graziano & Hart, 2016; Hart et al., 2016; Hart et al., 2019; McLeod et al., 2017; Nix et al., 2013; Pears et al., 2013). Definitions and measures varied across studies, including measures of prosocial behavior, social competence, emotion understanding, social-emotional skills, and social problem-solving. Targeted interventions were associated with mixed results on improving prosocial behavior. Three studies (Hart et al., 2016; McLeod et al., 2017; Pears et al., 2013) reported null effects on prosocial behavior. Studies reporting effect sizes reported a range of positive effects from 0.26 (Nix et al., 2013) to 1.50 (Graziano & Hart, 2016). Findings suggest that participation in prosocial behavior interventions is linked to null to large effects. Interestingly, targeting prosocial behavior may have a positive effect on school readiness for students with externalizing behavior concerns.

Graziano and Hart (2016) investigated the effectiveness of adding 30 minutes of daily self-regulation training to the KSRC intervention. Results indicated that students in the experimental group had significantly higher emotion knowledge ($d = 1.50$). Hart

et al.'s (2019) evaluation of the 4-week and 8-week version of the self-regulation enhanced KSRC found that although the 8-week group displayed the greatest improvement in emotion knowledge at the time of post-assessment ($g = 1.23$), all groups displayed comparable knowledge by the end of kindergarten. Hart et al.'s (2016) review of the high- and low-intensity versions of the KSRC compared to parent training alone found no significant differences between the three groups on prosocial behavior. Likewise, Pears et al. (2013) reported that there was no significant difference in prosocial behavior between students receiving KITS and in the control group. Together, these results indicate that comprehensive transition services with parent education components may increase prosocial behaviors for some, but not all children transitioning to kindergarten.

Transition interventions targeting improvement in prosocial behaviors for students from economically disadvantaged households demonstrated mixed results. Bierman et al. (2013) reported that students receiving the Head Start REDI intervention displayed improved social-problem solving skills compared to students in the control group ($\beta = 0.40$). Nix et al. (2013) provided evidence that these gains were maintained through kindergarten. They reported that prosocial behavior gains made during the Head Start REDI intervention were predictive of positive social behavior in kindergarten ($\beta = 0.26$). McLeod et al. (2017) also reviewed a community-based transition intervention administered with students from economically disadvantaged households (i.e., adapted lessons of the Incredible Years Classroom Dinosaur Curriculum; see Webster-Stratton, 1990). Results indicated that students receiving the intervention did not display any significant growth in prosocial behavior skills.

Collectively, some studies found that participation in transition services targeting prosocial behaviors was associated with small to large improvements in these behaviors, while others reported null effects. No studies indicated negative or iatrogenic effects. Across

studies reporting positive effects, most included an emotional or self-regulation component, suggesting that targeting prosocial and regulatory skills together may bolster kindergarten readiness.

Self-Regulation Outcomes

Self-regulation was also targeted by intensive transition interventions, with six studies including outcome measures related to this domain. Despite differences in time of implementation, dosage, and target groups, interventions targeting self-regulation skills reported consistently positive effects. For studies reporting effect sizes, effects ranged from small (i.e., 0.18; Pears et al., 2013) to large (i.e., 1.23; Graziano & Hart, 2016). An important trend with this category of interventions was their broad utility.

Pears et al. (2013) reported that children receiving the KITS intervention displayed small, but statistically significant, improved self-regulation skills compared to the control group ($d = 0.18$). Similarly, Pears et al. (2014) evaluated the impact of KITS on students with developmental disabilities, finding higher self-regulation skills among intervention participants compared to the control group ($d = 0.29$). These results are supported by McDermott et al. (2017), who found that students receiving the KITS intervention showed an improved ability to alter their performance and respond to feedback ($\eta^2_p = 0.15$).

Interventions targeting the improvement of self-regulation skills for students displaying externalizing behavior concerns also had a positive impact. Graziano and Hart (2016) reported that students receiving the self-regulation enhanced version of the KSRC displayed greater growth in emotional executive functioning compared to students receiving the traditional KSRC and parent services alone ($d = 1.23$). Increasing the duration of the intervention, however, did not result in significantly more self-regulation growth. Comparing a 4-week and 8-week version of the KSRC, Hart et al. (2019) reported that while both groups displayed significantly improved self-regulation across a series of measures compared to

the control group, there was minimal difference in growth between groups.

There is also emerging evidence that supports the use of intensive transition interventions targeting self-regulation for children with no preschool experience. Duncan et al. (2018) reported on the effects of adding a self-regulation intervention, Red Light Purple Light ([RLPL]; see Tominey & McClelland, 2011), to a summer kindergarten readiness program (i.e., Bridge to Kindergarten; [B2K]; see Yoshikawa et al., 2013). Students receiving the RLPL intervention displayed significant gains in self-regulation compared to students receiving the traditional kindergarten readiness program, with growth estimated to be equivalent to four months of expected development. In sum, targeted transition interventions showed small to large positive effects on self-regulation skills with a range of student groups, including children with no previous school experience, children at-risk of behavior problems, children in the child welfare system, and children with developmental disabilities. Findings provide promising evidence that transition interventions targeting self-regulation are likely to support a successful transition to kindergarten.

Student-Teacher Relationship Outcomes

Three studies included in this review reported the effects of targeted transition interventions on the quality of student-teacher relationships in kindergarten (Eisenhower et al., 2016; Hart et al., 2016; Sprague & Perkins, 2009). Results in this domain were mixed, with two studies reporting positive outcomes (Hart et al., 2016; Sprague & Perkins, 2009), and one study reporting no direct effects (Eisenhower et al., 2016).

Studies reporting positive effects both implemented direct services with students. Hart et al. (2016) reported that students in both the 4-week and 8-week version of the KSRC displayed fewer conflicts with their teachers compared to the control group, but students in the 8-week version experienced the greatest

reduction in student-teacher conflicts ($d = -0.45$). Likewise, Sprague and Perkins (2009) reported positive effects of the First Step to Success intervention on improving the quality of student-teacher relationships during the kindergarten transition. Students receiving the intervention displayed an increase of nearly five positive student-teacher interactions per day following intervention. Similarly, the number of negative student-teacher interactions decreased by about five interactions per day. Conversely, Eisenhower et al. (2016) reported overall participation in Starting Strong had no direct effect on student-teacher relationship quality ($d = -0.002$). However, it is important to note that students who began the intervention with low quality student-teacher relationships at baseline experienced significantly higher quality student-teacher relationships after intervention, compared to the control group.

Collectively, targeted transition interventions demonstrated emerging evidence of moderately positive impacts on student-teacher relationship quality. The most effective interventions were those that administered direct services to students. Evidence suggested that stronger impacts may result for students with low-quality initial student-teacher relationships.

On-Task Behavior Outcomes

Two studies examined targeted transition interventions for improving on-task behavior. Hains (1992) investigated a checklist intervention with students with developmental disabilities, finding that three out of the four students receiving the intervention demonstrated improvements in on-task behavior. Sprague and Perkins (2009) reported that academic engaged time for four students receiving First Step to Success was 64% at baseline and 89% after intervention. Increases were maintained at 91% of observed intervals during follow-up. These studies provide emerging evidence that transition interventions targeting on-task behavior may be beneficial.

Multi-Domain Behavioral Readiness Outcomes

Three studies included multi-domain measures of behavioral readiness for kindergarten. These measures evaluated students' capacities across behavioral skills relevant to kindergarten transition. Kindergarten transition interventions targeting multiple domains were associated with small, but significant, positive effects. This was true for interventions providing direct support to children as well as those targeting parenting skills to support children's behavioral functioning.

Two studies examined the effects of a targeted transition intervention on students' learning engagement (i.e., self-regulation, attention, motivation, and engagement). Bierman et al. (2013) reported that students who participated in the Head Start REDI intervention were rated by their teachers as more engaged and motivated in the classroom ($\beta = 0.28$). These results were supported by Nix et al. (2013), who reported that the growth of targeted behavior skills during the Head Start REDI intervention had a significant effect on student's learning engagement in kindergarten. Growth in prosocial behavior was found to have the largest impact on learning engagement ($\beta = 0.26$). These findings suggest that participation in the Head Start REDI program is associated with small, but significant, increases in learning engagement behaviors.

Stormshak and colleagues (2020) reported on the effects of the Family Check-Up (FCU; Stormshak et al., 2010). The researchers reported a small effect of the intervention on the reduction of child behavioral concerns in kindergarten ($d = 0.20$), providing emerging evidence that behavioral outcomes can be targeted through improvements in parenting techniques.

Study Quality

Studies were also coded for methodological quality to assess risk of bias using the JBI Checklist for Randomized Controlled Trials, JBI Checklist for Quasi-Experimental Studies, and the WWC Standards for Single-Case Designs. 14 studies were assessed using the JBI Checklist for Randomized Controlled Trials, with scores ranging from 8/13 to 10/13.

Table 3

Study Quality for Randomized Controlled Trials

Authors	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	Total
Bierman et al. (2013)	1	0	1	0	0	1	1	1	1	1	1	1	1	9
Duncan et al. (2018)	1	0	0	0	0	0	1	1	1	1	1	1	1	8
Eisenhower et al. (2016)	1	0	0	0	0	0	1	1	1	1	1	1	1	8
Fraziano & Hart (2016)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Hart et al. (2016)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Hart et al. (2019)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Lynch et al. (2017)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
McDermott et al. (2017)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Stix et al. (2013)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Wears et al. (2012)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Wears et al. (2013)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Wears et al. (2014)	1	0	1	0	0	0	1	1	1	1	1	1	1	9
Wormshak et al. (2020)	1	0	0	0	0	0	1	1	1	1	1	1	1	8
Wenz-Gross et al. (2018)	1	0	1	0	0	1	1	1	1	1	1	1	1	10

Note. See Appendix B for full description of criteria. The 13 criteria listed here map onto the 13 criteria listed on the checklist.

A detailed breakdown of study quality is in Table 3. An area that was consistently rated poorly involved keeping outcome assessors blind to treatment assignment, with only one study meeting this criterion (i.e., Wenz-Gross et al., 2018). Consistent strengths were the similarity of treatment groups at baseline, the use of robust

outcome measures, and the utilization of follow-up procedures. McLeod et al. (2017) was the only study utilizing a quasi-experimental design and thus was evaluated using the JBI Checklist for Quasi-Experimental Designs. This study obtained a score of 5/7 (C4 and C7 omitted for relevance), with a poor rating for a lack of multiple measurements before and after intervention, as the researchers only used a single measure to assess behavioral outcomes. Finally, the methodological quality of two studies (Hains, 1992; Sprague & Perkins, 2009) was assessed using the What Works Clearinghouse (WWC) Standards for Single-Case Designs. Table 4 provides an overview of specific criteria. Both studies were scored 4/4, indicating that they met 100% of the quality indicators for single-case designs.

Discussion

This review synthesized the existing research on interventions designed to improve students' behavioral transition to kindergarten. Reviewed interventions varied on setting, duration, dosage, period of implementation, behavioral skills targeted, and groups targeted. Nevertheless, 15 out of 17 studies reported positive effects. Those studies not finding positive outcomes reported null effects. Further, the studies reviewed included participants who varied on race, ethnicity, socioeconomic status, disability status, and risk status for poor kindergarten adjustment. An important finding from this review was that transition practices were effective with a wide range of students, including students who are involved in the foster care system, with developmental disabilities, from economically disadvantaged households, and with no prior preschool experience.

Table 4

Study Quality for Single-Case Designs

Authors	C1	C2	C3	C4	Total
Hains, 1992	1	1	1	1	4
Sprague & Perkins, 2009	1	1	1	1	4

Note. See Appendix D for full description of criteria. The criteria listed here map onto the four criteria listed under the "Criteria for Designs that Meet Evidence Standards" section.

Universal Transition Practices

One primary aim of this study was to synthesize the available research on universal transition practices. However, only one study reporting such a strategy met the inclusion criteria for the present review (Wenz-Gross et al., 2018). Wenz-Gross et al. reported that the Second Step Early Learning Curriculum was associated with improved executive functioning skills in students transitioning to kindergarten. Although these authors did not report improved global kindergarten readiness outcomes, executive functioning is a critical skill for school readiness, suggesting the Second Step Early Learning Curriculum may be a potential option for schools targeting executive functioning with all incoming kindergarteners. However, due to the limited evidence presented here, this intervention should be implemented with caution.

Targeted Transition Interventions

A second aim of this review was to understand the extent to which targeted interventions promoted positive behavioral school readiness. Overall, the included studies suggested promising results, with effect sizes ranging from -1.34 for reduction of undesired behaviors (Graziano & Hart, 2016) to 1.50 for improvement of desired behaviors (Graziano & Hart, 2016). Reviewed targeted interventions provided supports to parents, students, teachers, and multiple groups. The most common approach, which was also the approach with the greatest empirical support, involved those interventions that targeted multiple groups. Eleven studies reported on interventions that targeted a combination of students and caregivers, with all reporting positive effects on student behavioral outcomes. This pattern of positive outcomes was unique to this group of interventions, as interventions targeting only students or only parents displayed more mixed results. Given the importance of the involvement of families, these results are consistent with the underlying theory of the DEM (Rimm-Kaufman & Pianta, 2000), which holds that high quality relationships can help address challenges faced by a student during the transition to kindergarten.

Although behavioral functioning was the most common outcome measure, self-regulation appears to be the most critical underlying behavioral skill pertinent to kindergarten transition. Interventions that included self-regulation training were not only effective in improving self-regulation capacities, but there is evidence that these self-regulation gains contributed to improvements in behavioral functioning, prosocial behavior, and student-teacher relationship quality. Another relevant factor in promoting behavioral readiness for kindergarten is the importance of developmental timing. Fourteen studies reported on interventions that were implemented prior to kindergarten entry, underscoring the significance of this developmental period for skill development.

A potential limitation of these interventions is their intensive implementation and resource requirements. Interventions that begin prior to kindergarten require strong collaboration between school districts, families, and communities, as well as the availability of resources, which may be a barrier to implementation. The Head Start REDI intervention and checklist intervention outlined by Hains (1992) may act as good models for schools wishing to provide transition services to students but unable to deliver more intensive interventions due to these constraints. Both require minimal resources and can be implemented by classroom teachers.

Limitations

This review is not without its limitations. Relevant articles may have been omitted due to the search strategy, inclusion criteria, or search terms. If other inclusion criteria or search terms were utilized, different studies might be identified. Gray literature (e.g., dissertations, theses, books, technical reports) was not included, yet there may be relevant findings in the gray literature that could inform school-based practices. Therefore, it is possible the studies included in this review do not represent the full scope of available research on this topic.

There were also limited findings identified related to universal kindergarten transition supports. Thus, it was challenging to draw conclusions regarding the effects associated with universal transition services. No informal, universal transition supports (e.g., open houses) were identified in the current review, making evaluation of these commonly used practices impossible. Further, transition programs exist that have yet to be evaluated in the empirical literature (e.g., see Cappelloni, 2012; Mashburn et al., 2018). Without empirical investigations, the impact of these programs on children's behavioral functioning at kindergarten entry cannot be determined. More research on universal supports and other programs is necessary to draw reliable conclusions.

Finally, while many positive outcomes were associated with targeted transition interventions for specific groups (e.g., children involved in the child welfare system), these results may not hold for other kindergarteners. It is important to consider each study sample when applying the results presented in this review, as the generalizability of the findings in this review is limited to students similar to the students included in the reviewed studies.

Implications for Practice

It is imperative that schools have a menu of transition services and interventions that can be utilized in a multi-tiered system of support (MTSS) delivery model. This includes universal transition practices that can improve the behavioral readiness of all students, as well as targeted interventions that meet the needs of students entering kindergarten at elevated levels of risk. While the evidence on universal transition interventions was scant, findings provide strong support for the impact of targeted transition interventions for improving behavioral kindergarten readiness. Schools should aim to collaborate with families to provide early intervention for students at elevated risk of poor behavioral adjustment to kindergarten, specifically targeting self-regulation skills. These interventions should be comprehensive and multimodal, targeting both students

and parents. Namely, efforts should be made to strengthen not only the behavioral skills of students, but also the skills of parents, who play a pivotal role in the kindergarten transition process. When partnering with families, however, it is essential to understand for whom and under what conditions empirical support exists for the various intervention strategies discussed in this review (see Tables 1 and 2) as outcomes may vary. Further, practitioners should be aware that not all families share similar views regarding readiness for kindergarten, behavioral expectations, or academic goals. Practitioners are encouraged to use the results presented here as a starting place to discuss strategies with families, and to co-create a targeted intervention plan that is mutually acceptable to both the educators and the family. With that in mind, we acknowledge that facilitating successful behavioral readiness for kindergarten is a complicated process involving many components, and this review provides guidance on key skills to target and how to best target them in an effort to strengthen schools' ability to support the needs of all kindergarteners.

Recommendations for Future Research

A prominent finding of this review was the disparity in extant research between universal transition practices and targeted interventions. Out of the 17 studies reviewed, 16 reported on interventions designed to be implemented students with elevated levels of risk. Still, the transition to kindergarten may be difficult for all students (Rimm-Kaufman et al., 2000). Further research is needed on the impact of universal transition practices used to foster behavioral skills relevant to successful transition for all students. Further research is also needed to explore the impact of transition interventions implemented in kindergarten. The vast majority of literature focuses on transition interventions that begin prior to kindergarten, and these interventions may not be possible for all school districts due to barriers (e.g., access to student, finances, resources, etc.). In order to promote equity, it is essential that school

districts facing these obstacles have access to evidence-based transition interventions that are less resource-intensive.

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