Improving interactions between parents, teachers, and staff and individuals with developmental disabilities: a review of caregiver training methods and results

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Individuals with developmental disabilities (DD) depend on caregivers to meet physical, emotional, and social needs. This makes relationships with caregivers particularly important to quality of life. Without intervention, social interactions may be limited and ineffective, affecting relationships with caregivers and thus quality of life for individuals with DD. Training may improve interactions between caregivers and individuals with DD. Training content and methods, however, are heterogeneous. A review was conducted to identify common elements and methods and analyze variables shown to be most effective in improving outcomes for caregivers and individuals with DD. In general, studies of professional caregiver training (e.g. teachers, staff members) focused primarily on increasing positive interactions or praise, while parent training studies focused more broadly on parenting skills, of which positive interaction was one facet. Training methods differed, but there was some evidence to suggest that those studies that included some element of *in situ* practice and feedback yielded more robust effects. While caregiver acceptability and/or satisfaction surveys were administered in the majority of studies, fewer studies attempted to measure the satisfaction of individuals with DD. Future research topics are presented in light of these findings.

KEYWORDS: Caregiver training; staff training; parent training; interaction training; behavior-specific praise; intellectual and developmental disabilities; parent-child interaction

Family members, professional caregivers, and teachers play an integral role in the lives of individuals with developmental disabilities (DD). Their responsibilities are varied and far-reaching, and include ensuring that basic physical, social, and emotional needs are met. This is true for caregivers of children with DD, but this unique role of caregivers may extend into adulthood as well. Many individuals with DD require intensive support of caregivers, and those with more severe DD may be completely dependent on caregivers throughout their lifespans (Maes *et al.* 2007). This reliance on caregivers makes the relationships with caregivers even more significant. Additionally, family members and/or professional caregivers often provide a primary source of socialization and emotional support for those individuals with DD who have limited friendships or community involvement (Robertson *et al.* 2001). Schalock (2004) identified interpersonal relations as one of the eight core quality of life domains, indicated by social interactions, relationships, and supports. Of the eight

domains, the interpersonal relationship domain was the most referenced by the quality of life studies analyzed (Schalock 2004). Given the importance of interpersonal relations, it is reasonable to assert that social interaction with significant others can affect quality of life.

The quality of social interactions between caregivers and individuals with DD may affect these important relationships. To complicate matters, individuals with DD may have impairments in communication and social skills which can make social interaction more difficult. Research has shown that quality of interactions between caregivers and individuals with DD is not always ideal. Further, with a focus on meeting basic needs, caregivers may spend more time using prompting, instruction, and oversight than on praising or making statements of approval. McIntyre (2008a, 2008b) reported observed high rates of baseline parenting behavior that included ineffective commands, lack of follow through, criticism, and aggression with low rates of praise in parents of children with DD. Antonini *et al.* (2014) reported that baseline levels of what they termed “undesirable” statements (e.g. questions, commands,

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criticism) were much greater than levels of positive statements (e.g. praise, reflective statements) in parents of children with pediatric traumatic brain injury (TBI).

This is consistent with what researchers have found with professional caregivers as well. Baseline data revealed low quantity and quality of staff interactions with individuals with DD receiving care (Finn and Sturmey 2009; Zoder-Martell *et al.* 2014). Duchaine *et al.* (2011) reported near-zero baseline rates of praise by inclusion teachers in classrooms that contained students with DD.

Interaction between caregivers and individuals with DD is a complex topic. Caring for an individual with DD can be demanding, and many caregivers report stress (Devereux *et al.* 2009; Lindo *et al.* 2016). Stress can also impact the quality of interactions (Devereux *et al.* 2009). A pattern of poor interactions with caregivers may adversely affect relationships and possibly result in the modeling of inappropriate social skills, thus affecting acceptance in the community and the development of friendships.

The quality of interaction between caregivers and individuals with DD may also affect behavior. Individuals with DD are at risk for developing challenging behavior (National Institute for Health and Care Excellence 2015). Poor interactions with caregivers may contribute to the development of challenging behavior. Floyd *et al.* (2004) reported an association between negative parent-child interactions characterized by parent disapproval and problem behavior of children with ID/DD. Additionally, improving interactions between caregivers and individuals with DD has been shown to improve behavior (McLaughlin and Carr 2005).

While quality of interactions can impact behavior in individuals with DD, challenging behavior can also influence quality of interactions. Hastings (2005) suggested that the development and maintenance of challenging behavior has transactional elements, in that challenging behavior affects and is affected by caregiver behavior, emotions, and stress. Challenging behavior can result in a negative interaction pattern with caregivers, as caregivers manage behavioral challenges while trying to keep themselves and others safe from harm. Caregivers of individuals with DD who display challenging behavior report anxiety, stress, and other negative emotions (Campbell 2011). This may further reduce the quality or quantity of interactions with individuals with DD, which may, in turn cause further challenging behavior. In this way, poor interactions between caregivers and individuals with DD can increase risk of staff turnover, residential placement, and other consequences that can decrease quality of life for individuals with DD.

Many researchers have sought to decrease caregiver stress (Lindo *et al.* 2016). In fact, decreasing stress

levels in staff members may increase positive interactions with individuals with ID (Rose *et al.* 1998). Other researchers have focused on decreasing challenging behavior of individuals with DD through caregiver training of behavioral techniques (Gormley *et al.* 2020). Another method of intervening, however, is to train caregivers to interact effectively with individuals receiving care. Aside from improving skills, research suggests that caregiver training can result in a more positive view of the individuals with DD who display challenging behavior (Heaton and Whitaker 2013; Rose *et al.* 2014). Studies on training caregivers to interact with individuals with DD are diverse, differing greatly in overall goals, content, method, modality, and length of intervention. The present paper will present a review of recent studies to provide (1) an overview of interaction training in the last 20 years and (2) insight into current issues related to training caregivers to interact effectively with individuals with DD.

Method

Search

A literature search was conducted using EBSCO Academic Search Elite, PsychArticles, PsychInfo, and ERIC. Results were limited to articles from scholarly, peer-reviewed journals only, written in English, and published between the years 2000 and March 2020. Systematic searches were conducted using the terms staff, parent, caregiver, teacher, developmental disabil*, intellectual disabil*, autis* with each of the following search terms: training 'and' interac*, coaching 'and' interac*; training 'and' praise. The titles and abstracts of these results were reviewed for relevance. If title and abstracts were ambiguous, the full article was reviewed.

Once the results from this initial search were reviewed against inclusion/exclusion criteria, searches were conducted using all authors of and names of training programs used in selected articles. A search for articles citing each selected article was then conducted. The reference lists of all included articles were reviewed. Finally, the reference lists from all review articles and meta-analyses on caregiver training found during the search were reviewed.

Selection criteria

Inclusion criteria. Inclusion criteria were as follows:

Participants

Caregivers. Parents, teachers, or staff members of at least one individual meeting criteria for individuals with DD. Note: While teachers are not always considered care providers, those who teach individuals with more significant impairments do play a strong caregiving role, and as such were included in the category of caregivers for the purposes of this review.

Individuals with DD. Individuals at least three years of age, with a diagnosis of an intellectual disability/developmental disability (ID/DD), pediatric traumatic brain injury (TBI), autism

spectrum disorder, developmental delay or learning disability (LD) other than ADHD.

If the individuals receiving care had more than one diagnosis, the article was included provided one of the diagnoses was ID/DD, ASD, developmental delay, or LD. If some participants had different diagnoses, the article was included provided at least some of the participants had one of the included diagnoses.

Training content. Training content included improvement and/or increase of communicative interaction between caregiver(s) and individual(s) receiving care.

Intervention. The intervention consisted of training, instruction, or coaching of caregivers that involved at least some antecedent training method (e.g., workshop, didactic instruction, video modeling) and not simply performance feedback.

Dependent variable. At least one dependent variable included a measure of interaction (e.g., number of praise statements) that was recorded during direct observation of caregivers with individuals receiving care.

Intervention goal. Primary goal for intervention was to improve caregiver-client interactions (i.e., not as a treatment to improve behavior or to teach skills to individuals with DD)

Experimental methods: The article was empirical, with training as the independent variable

Exclusion Criteria. The following types of articles were excluded from this review.

Participants.

- Individuals receiving care were diagnosed with or at risk for emotional/behavioral disorders, had an unspecified diagnosis, physical disability, and/or ADHD and did not also have ID/DD, ASD, developmental delay, or other LD.
- Individuals receiving care were not described in sufficient detail that a determination could be made as to whether the article would meet criteria for inclusion.
- Individuals with DD were younger than three years of age.

Training content.

- Articles investigating the effects of training of other skills (e.g., mindfulness, problem solving) on interactions
- Training content was joint attention, play or storytelling skills, or teaching active support rather than social interaction (see intervention goals).

Intervention.

- Training method included only consequence methods, such as performance feedback
- Intervention was Parent-Child Interaction Therapy, as this is a parent-implemented intervention designed to decrease child disruptive behavior (Bagner and Eyberg 2007).

Dependent variable.

- Dependent variables were assessed only with rating scales
- Dependent variables were only for individuals receiving care (i.e., no data were taken on caregivers)

Intervention goal. The purpose of the training was solely to develop communication/language skills or improve behavior of the individual with DD rather than improve interactions.

Data extraction

This search yielded 22 articles that met criteria for inclusion. These were categorized according to type of

caregiver participant—teachers (9 studies), staff (8 studies) and parent (5 studies) due to the fact that studies in each category tended to have some degree of similarity in goals and methodology. Table 1 lists role of caregiver; number of participants; diagnosis, functioning level, age, and gender of individuals with DD; individuals with other diagnoses; and setting.

A statistical analysis was not performed due to the small sample size and large variation in methodology across articles. Data were extracted on the following variables: training objectives, content, training methods, training length, dependent measures, experimental methodology, and results. Data on characteristics of individuals with ID (e.g. functioning level, age, gender) were insufficient across studies to permit a meaningful analysis of the effect of these variables on outcomes.

Results

Training objectives and dependent variables

At least one goal for all studies was to improve interactions between caregivers and individuals receiving services. In general, studies of professional caregiver training (e.g. teachers, staff members) tended to focus primarily on increasing positive interactions with individuals receiving care, while parent training studies focused more broadly on parenting skills, of which positive interaction was one facet.

Teachers and staff members

Training objectives of 11 studies included increasing staff (Finn and Sturmey 2009; Smidt *et al.* 2007; Zoder-Martell *et al.* 2014) and teachers' (Duchaine *et al.* 2011; Dufrene *et al.* 2014; Keller *et al.* 2005; Pinter *et al.* 2015; Rathel *et al.* 2014; Simonsen *et al.* 2010; Slider *et al.* 2006; Sutherland and Wehby 2001) use of general praise or approval and/or behavior-specific praise. Of these 11 studies, five also had objectives to increase other communicative, classroom, or social responses (Finn and Sturmey 2009; Simonsen *et al.* 2010; Slider *et al.* 2006; Smidt *et al.* 2007, Zoder-Martell *et al.* 2014). Five of these 11 studies had objectives that focused both on increasing positive interactions while decreasing negative interactions or improving the ratios between positive and negative interactions (Finn and Sturmey 2009; Pinter *et al.* 2015; Rathel *et al.* 2014; Sutherland and Wehby 2001; Zoder-Martell *et al.* 2014).

The remaining five studies of professional caregiver training also had training objectives to improve communication or interactions of staff or teachers but used dependent measures unique to those studies (Damen *et al.* 2011; Dobson *et al.* 2002; Purcell *et al.* 2000; Tschantz and Vail 2000; Vanono *et al.* 2013).

Table 1. Demographic information reported for caregivers, individuals with DD, and setting.

Caregiver Type	Authors (Year)	Number of Caregiver Participants at start of study	Ind. with DD: Diagnosis (number)	Ind. With DD: Functioning Level	Ind. With DD - Age	Ind with DD - Gender	Ind. with other diagnoses (number)	Setting
Teachers	Duchaine <i>et al.</i> (2011)	3	LD (9)	–	15–17 yrs	–	OHI (3); EBD (4); unknown disability (2); comorbid psychiatric disorders	Inclusion high school classrooms
Teachers	Dufrene <i>et al.</i> (2014)	2	LD (2); ID (1)	–	7–13 yrs	–	EBD (4); OHI/ADHD (3); unknown disability (2); comorbid psychiatric disorders	Alternative elementary classrooms with supports
Student teacher interns	Keller <i>et al.</i> (2005)	3	Various unspecified	–	Unspecified	–	–	Self-contained, special ed classrooms (K-5)
Teachers	Pinter <i>et al.</i> (2015)	4	LD; cognitive impairment, multiple disabilities, ASD	–	Unspecified	–	EBD; OHI	Special ed classrooms (middle – high school)
Teachers	Rathel <i>et al.</i> (2014)	4	ASD (1); LD (1)	–	6–12 yrs	1 female, 3 male	EBD (2)	Self-contained special ed classrooms (K-12)
Teachers	Simonsen <i>et al.</i> (2010)	3	ASD, DD (approx. total 7–21)	–	11–18 yrs	–	EBD	Special ed classrooms
Teachers	Slider <i>et al.</i> (2006)	3	Speech delay (12–18)	Mild-moderate	2–5 yrs	–	–	Preschool classrooms
Teachers	Sutherland and Wenby (2001)	20	LD (48); ID (20)	–	–	33 female, 183 male	EBD (112); unspecified (33)	Self-contained classrooms (K-8)
Teachers	Tschantz and Vail (2000)	3	Significant developmental delay (11); ASD (1); ID (1)	Mild (1), significant (11)	3–5 years	3 female, 10 male	–	Head Start classrooms
Direct-support staff	Damen <i>et al.</i> (2011)	72	ID with visual impairment (12)	Moderate (2), severe (5), profound (5)	13 – 54 yrs	5 female, 7 male	–	Residential facility
Direct-support staff	Dobson <i>et al.</i> (2002)	9	LD with physical disabilities (9)	Profound	20–38 yrs	–	–	Adult day center
Direct-support staff	Finn and Sturmey (2009)	8	ID with dual diagnosis of psychiatric disorders (40–48)	–	Adults	–	–	Adult day habilitation facility
Staff (direct-support staff, teachers, nurses, managers)	Purcell <i>et al.</i> (2000)	25	ID (24)	–	27–55 yrs	13 female, 11 male	–	Residences and day centers
Direct-support staff	Realon <i>et al.</i> (2002)	11	ID with various co-occurring disabilities (19)	Profound	19–42 yrs	12 female, 7 male	–	Residential care facility
Direct-support staff	Smidt <i>et al.</i> (2007)	18	ID (1); Down syndrome/visual impairment (1); ASD/ID (1)	–	22–54 yrs	2 female, 1 male	–	Residential units
Direct-support staff	Vanono <i>et al.</i> (2013)	4	ID with dual diagnosis of psychiatric disorders, Down syndrome, and/or ASD (14)	Mild (9), moderate (4)	26–68 yrs	4 female, 10 male	–	Adult day program

(Continued)

Caregiver Type	Authors (Year)	Number of Caregiver Participants at start of study	Ind. with DD: Diagnosis (number)	Ind. With DD: Functioning Level	Ind. With DD - Age	Ind with DD - Gender	Ind. with other diagnoses (number)	Setting
Direct-support staff	Zoder-Martell <i>et al.</i> (2014)	4	ID (42)	Mild - profound	unspecified	6 female, 36 male	-	Residential facility
Parents	Antonini <i>et al.</i> (2014)	37	Pediatric TBI (37)	Mild - severe	3-9 years	12 female, 25 male	-	Internet-based training
Parents	George <i>et al.</i> (2011)	5	LD (4)	Moderate - severe	Mean age 6.25 yrs	2 female, 2 male	-	Unspecified training location
Parents	McIntyre (2008a)	49	Developmental delays; ASD (25)	Mild-moderate	2-5 years	2 female, 23 male	-	Home assessments; unspecified group training location
Parents	McIntyre (2008b)	25	developmental delays (12); ASD (13)	Mild-moderate	2-5 yrs	6 female, 19 male	-	Community early education programs
Mothers	Phaneuf and McIntyre (2011)	8	ASD (3); speech/language delays (3); developmental delays (2)	Mild-moderate	2-4 yrs	-	-	Homes; group training at early childhood education program

Note: ADHD, attention deficit hyperactivity disorder; ASD, autism spectrum disorder; DD, developmental disability; EBD, emotional behavioral disorder; ID, intellectual disability; ind., individuals; LD, learning disability; OHI, other health impaired; TBI, traumatic brain injury.

Parents

The training objective for all of the parent training studies was to improve parenting skills. Antonini *et al.* (2014) used a composite measure of positive parenting that took into effect behavior-specific praise (BSP) and reflective statements. The remaining four parent training studies included composite measures of what was termed negative and positive parenting strategies. Negative parenting strategies included inappropriate play, directive, response to behavior challenge, lack of follow through, criticism, and aggression; while positive strategies included descriptive comments and praise (George *et al.* 2011; McIntyre 2008a; McIntyre 2008b; Phaneuf and McIntyre 2011).

Training methods

Table 2 displays the name of the training program, general training methods, length of training, whether treatment integrity was assessed, whether training was criterion-based, and general results for caregivers and individuals with DD. There was considerable overlap in methods used across all studies. For ease of analysis and to better highlight the methodological differences, this section is not further divided by caregiver type.

Ex situ components

Training methods in all studies included at least one instructional session that was conducted *ex situ* (i.e. not in the natural environment or with individuals with DD). One study presented information in printed packets using a self-study training method (Slider *et al.* 2006), and one study conveyed this information in a Web-based format (Antonini *et al.* 2014). The remaining studies conducted *ex situ* sessions in person.

At minimum, *ex situ* sessions included didactic instruction such as presentation of definitions of skills, rationale and benefits to using the target skills, examples and non-examples, and discussion. In addition to basic verbal instructions being given on the training content, nine studies indicated that role play and/or simulated or *ex situ* practice of the skills was included as part of the training (Antonini *et al.* 2014; Damen *et al.* 2011; Dobson *et al.* 2002; George *et al.* 2011; McIntyre 2008a; McIntyre 2008b; Phaneuf and McIntyre 2011; Purcell *et al.* 2000; Simonsen *et al.* 2010). Video modeling of skills was also used in six studies (Antonini *et al.* 2014; George *et al.* 2011; McIntyre 2008a; McIntyre 2008b; Phaneuf and McIntyre 2011; Slider *et al.* 2006). Eight studies analyzed the performance of trainees prior to training through reviewing and discussion of data (Duchaine *et al.* 2011; Finn and Sturmey 2009; Sutherland and Wehby 2001) graphed data (Keller *et al.* 2005; Rathel *et al.* 2014) or videos (Dobson *et al.* 2002; Purcell *et al.* 2000; Smidt *et al.* 2007) recorded in baseline and/or prior to the beginning of training. Six studies

Table 2. Training program, methods, duration, treatment integrity, and social validity.

Caregiver Type	Authors (Year)	Name of Training Program	In /ex situ	Training Methods	Length of Training	Treatment Integrity Assessed	Criterion based	Caregiver Results	Ind with DD effect
Teachers	Duchaine <i>et al.</i> (2011)	–	In situ, ex situ	Didactic instruction, goal-setting, coaching, performance feedback	45 min initial training	Yes	–	*Significant, not maintained	No change
Teachers	Dufrene <i>et al.</i> (2014)	–	In situ, ex situ	Didactic instruction, practice, feedback; immediate feedback via one-way radio	Initial training (30 min)	Yes	–	Significant	Partial
Student teacher interns	Keller <i>et al.</i> (2005)	–	In situ, ex situ	Didactic instruction, self-evaluation, goal-setting	Unspecified	–	–	Significant, decreasing during maintenance	–
Teachers	Pinter <i>et al.</i> (2015)	–	In situ, ex situ	Didactic instruction, video self-evaluation, goal setting	1 hr didactics + video self-evaluation – 3x per week, 15 min sessions	–	–	Mixed	–
Teachers	Rathel <i>et al.</i> (2014)	–	In situ, ex situ	Didactic instruction, emailed performance feedback	30-min initial training + email feedback after observations	Yes	Yes	Mixed	Yes
Teachers	Simonsen <i>et al.</i> (2010)	PORT	In situ, ex situ	Discussion, activities, practice, development of self-management strategy, performance feedback	30-60 min sessions, total duration unspecified	–	–	Significant	–
Teachers	Slider <i>et al.</i> (2006)	–	Ex situ only	Reading material, video modeling, self-test, performance feedback	Three videos, 15-25 min	–	–	Significant	–
Teachers	Sutherland and Wehby (2001)	–	In situ, ex situ	Didactic instruction, practice, goal-setting	Unspecified	yes	Criteria for data collection only	Significant, not maintained	Yes
Teachers	Tschantz and Vail (2000)	–	In situ, ex situ	Peer coaching, didactic instruction, modeling, feedback	Coaching 2x/week (35-45 min sessions)	Yes	Yes	Significant, decreasing during maintenance	–
Direct-support staff	Damen <i>et al.</i> (2011)	Contact	In situ, ex situ	Didactic instruction, practice, video feedback	1-day meeting + 4 individual sessions	–	–	Significant	No
Direct-support staff	Dobson <i>et al.</i> (2002)	–	Ex situ only	Didactic instruction, goal setting, role play, practical exercises, self-examination through video	39 hrs	–	–	Significant	–
Direct-support staff	Finn and Sturmeay (2009)	–	In situ, ex situ	Didactic instruction, modeling, practice, feedback; peer training	–	–	Yes	Significant no maintenance	–
Staff	Purcell <i>et al.</i> (2000)	–	Ex situ only	Didactic instruction; simulated activities, video observations, performance feedback	2 whole-day meetings or unspecified number of 1:1 sessions	–	–	No effect	No
Direct-support staff	Realon <i>et al.</i> (2002)	PEP	In situ, ex situ	Didactic instruction; practice, feedback	one 45-min session + observation/feedback sessions	–	Yes	Partial	Yes

(Continued)

Caregiver Type	Authors (Year)	Name of Training Program	In /ex situ	Training Methods	Length of Training	Treatment Integrity Assessed	Criterion based	Caregiver Results	Ind with DD effect
Direct-support staff	Smidt <i>et al.</i> (2007)	MOSAIC	Ex situ only	Didactic instruction, video self-modeling, practice, peer feedback	4 sessions	–	–	Partial	No
Direct-support staff	Vanono <i>et al.</i> (2013)	–	Ex situ only	Interactive workshop	3-hr session	–	–	Partial	No
Direct-support staff	Zoder-Martell <i>et al.</i> (2014)	–	In situ, ex situ	Didactic instruction, prompts via one-way radio; performance feedback as needed	Unspecified	yes	yes	Significant	No
Parents	Antonini <i>et al.</i> (2014)	I-InTERRACT	In situ, ex situ	Self-guided online didactic instruction, synchronous videoconference coaching (role-play, simultaneous feedback)	10 core sessions + 4 supplementary sessions	–	–		
Parents	George <i>et al.</i> (2011)	Incredible Years	Ex situ only	Group discussion, didactic instruction, video vignettes, roleplaying, feedback, homework	24 hrs	–	–		
Parents	McIntyre (2008a)	Incredible Years	Ex situ only	Group discussion, video vignettes, role-play, didactic	Unspecified	Yes	–		
Parents	McIntyre (2008b)	Incredible Years	Ex situ only	Group discussion, video vignettes, role-play, didactic	12 sessions (30 hrs)	Yes	–		
Mothers	Phaneuf and McIntyre (2011)	Incredible Years	In situ, ex situ	instruction, homework Tier 1: Reading materials; Tier 2: group discussion, video vignettes, role-play, didactic instruction, homework, Tier 3: individualized video feedback (modeling, rehearsal, praise, corrective feedback)	Tier 1 (unspecified); Tier 2 (27.5 hrs); Tier 3 (up to 3 sessions of unspecified length)	Yes	Yes		

Note: I-InTERRACT, Internet-Based Interacting Together Everyday, Recovery After Childhood TBI; Incredible Years, Incredible Years Parent Training Program; MOSAIC, A Model of Observational Screening for the Analysis of Interaction and Communication; PEP, Positive Environment Program; PORT, prompt-occasion-reinforce training.

*Significant results refer either to statistical significance or demonstration of functional relation with systematic improvement in behavior following implementation of treatment.

included a component in which training participants set goals for themselves in terms of training content (Damen *et al.* 2011; Tschantz and Vail 2000) or specific performance goals (Duchaine *et al.* 2011; Keller *et al.* 2005; Pinter *et al.* 2015; Rathel *et al.* 2014; Sutherland and Wehby 2001; Zoder-Martell *et al.* 2014).

In situ components

The majority of studies included training packages that also included *in situ* components.

Observation and prompting. After *ex situ* training, three studies provided real-time prompting via earpiece to caregivers as they interacted with individuals with DD (Antonini *et al.* 2014; Dufrene *et al.* 2014; Zoder-Martell *et al.* 2014).

Observation and performance feedback. Nine studies used *in situ* performance feedback following *ex situ* training. Feedback was provided verbally (Finn and Sturmey 2009; Realon *et al.* 2002; Tschantz and Vail 2000), in written format (Duchaine *et al.* 2011; Rathel *et al.* 2014) or by video (Damen *et al.* Phaneuf and McIntyre 2011). Teachers in Simonsen *et al.* (2010) selected their own feedback modality—verbal or email. In the studies by Finn and Sturmey (2009) and Tschantz and Vail (2000), feedback was delivered by peers.

Data-based self-evaluation. Three studies used self-monitoring to improve and maintain behavior of teachers following *ex situ* training. Teachers recorded themselves in their classrooms, reviewed the recordings (Pinter *et al.* 2015) and/or graphed the frequency of praise statements used (Keller *et al.* 2005; Sutherland and Wehby 2001).

Completion of training

Studies also differed by the circumstances under which the training programs ended. The training programs in nine studies were curriculum-driven or time-based. Thus, once the content of the program was complete or a designated time period had elapsed, the training ended (Antonini *et al.* 2014; Dobson *et al.* 2002; George *et al.* 2011; McIntyre 2008a; McIntyre 2008b; Purcell *et al.* 2000; Smidt *et al.* 2007; Sutherland and Wehby 2001; Vanono *et al.* 2013). Other studies made data-driven determinations as to when the training would be complete. Training methods in six studies were criterion-based, such that training was completed once participants met pre-designated criteria for mastery (Finn and Sturmey 2009; Phaneuf and McIntyre 2011; Rathel *et al.* 2014; Realon *et al.* 2002; Tschantz and Vail 2000; Zoder-Martell *et al.* 2014). Six studies used experimental designs (e.g. multiple-baseline designs) that permitted close analysis of performance data (Duchaine *et al.* 2011; Dufrene *et al.* 2014; Keller *et al.* 2005; Pinter *et al.* 2015; Simonsen *et al.* 2010; Slider *et al.* 2006). Once the data showed a certain level or trend, it would be possible to make a determination that a skill was mastered, and thus, end the training. Only two such studies, however, specified the rules used to make decisions as to when training would be

completed, or when transition between phases in a training program would occur (Dufrene *et al.* 2014; Zoder-Martell *et al.* 2014).

Phaneuf and McIntyre (2011) illustrated the benefits of a data-based approach in their three-tiered approach to parent training. All parents received Tier 1 training, which included distribution of reading material. One participant met criteria at this level, demonstrating that this level of training was sufficient. This reduced the training burden for one participant while the others continued with the training that they still needed. The remaining parents participated in Tier 2 training, which consisted of 27.5 h of *ex situ* group training. After that, three parents met criteria, thus concluding training for those participants. The final parents who had not yet met criteria advanced to Tier 3, which consisted of *in situ* modeling, rehearsal, and performance feedback. Once these parents met criteria, training was complete for them. In this way, training was individualized to the needs and performance of the participants. Performance gains were maintained or improved at a 3-month follow-up for all participants as well.

Training effects

Caregivers

Teachers. All studies involving teachers demonstrated improvement in teacher behavior as a function of training. One study demonstrated statistically significant improvement in the skills of teachers following training using a repeated measures design (Sutherland and Wehby 2001). The remaining studies of teacher training used single-subject designs.

Sutherland and Wehby (2001) found that teachers who participated in training demonstrated statistically significant increases in praise statements relative to a control group. Improvements in praise-to-reprimand ratios were seen in both the training and control groups (Sutherland and Wehby 2001).

Six studies demonstrated a functional relationship between teacher training and an improvement in praise statements (Keller *et al.* 2005; Simonsen *et al.* 2010; Slider *et al.* 2006) BSP (Duchaine *et al.* 2011; Dufrene *et al.* 2014; Rathel *et al.* 2014) and/or ratio of positive:negative interactions (Rathel *et al.* 2014) using single-subject design methodology. Tschantz and Vail (2000) demonstrated a functional relationship between training and an increase in responsive statements by teachers. Pinter *et al.* (2015) and Rathel *et al.* (2014) reported mixed results.

In terms of maintenance, three studies demonstrated strong maintenance of performance gains. Duchaine *et al.* (2011) assessed at two and three weeks following training, and Dufrene *et al.* (2014) assessed at one and two months following training. The two participants that remained in study conducted by Rathel *et al.* (2014) demonstrated maintenance up to six weeks following training.

Two studies demonstrated maintenance levels higher than baseline, but with a decreasing trend (Keller *et al.* 2005; Tschantz and Vail 2000). Results were not maintained at one-month follow-up in the study conducted by Sutherland and Wehby (2001).

Staff. Five studies used AB or pre-test/post test designs to evaluate the effects of staff training. Two studies reported

statistically significant improvement in interaction skills (Damen et al. 2011; Dobson et al. 2002). Purcell et al. (2000) found no significant changes.

Two studies used AB designs without statistical analysis, and neither study demonstrated strong effects of training on staff (Realon et al. 2002; Vanono et al. 2013).

Two studies demonstrated a functional relationship between the staff training methods and at least one measure of interaction using a single-subject design (Finn and Sturmey 2009; Zoder-Martell et al. 2014). Smidt et al. (2007) reported mixed results.

Five studies reported data on maintenance of skills. Maintenance was reported up to six weeks (Zoder-Martell et al. 2014) and at six-months (Dobson et al. 2002). In Vanono et al. (2013) all three staff members demonstrated a further increase in positive interactions at eight-week follow-up. Results were not maintained in two studies (Finn and Sturmey 2009; Smidt et al. 2007).

Parents. Three studies showed statistically significant improvement in the skills of parents following training (Antonini et al. 2014; McIntyre 2008a; McIntyre 2008b). In a randomized clinical trial, parents who participated in I-InTERACT web-based training program demonstrated significant improvements in parenting skills (positive statements and praise following compliance) relative to parents in a control group (Antonini et al. 2014).

All other articles involving parent training used modifications of the Incredible Years Parent Training series (McIntyre 2008a). Using a randomized control study, McIntyre (2008a) reported a statistically significant decrease in inappropriate parenting behavior of parents who participated in parent training relative to controls. Both groups of parents showed increases in child-directed praise, however. Similarly, in a treatment-only study of this program, McIntyre (2008b) also found a statistically significant decrease in inappropriate parenting behavior with increases in praise that were not statistically significant. These results suggest this modified training program may be more effective in reducing negative parenting behavior than in increasing praise.

The results of George et al. (2011) provide preliminary support for the Incredible Years program modified for children with learning disabilities. They reported a decrease in inappropriate parenting skills and an increase in positive parenting skills in two participants (George et al. 2011).

In the only parent training using single-subject design, Phaneuf and McIntyre (2011) used a three-tiered model of training, in which parents progressed only as far as needed until a certain criterion of responding was reached. All seven participants who completed the program demonstrated sufficient decreases in negative parenting skills and increases in positive parenting skills to meet criteria for successful completion of the parent training program. Follow-up data were taken on six participants after three months. All six participants maintained or demonstrated further improvements in parenting skills at that time (Phaneuf and McIntyre 2011).

Individuals with DD

Fourteen studies included an assessment of training effects on individuals with DD.

Students. Four of the nine teacher training studies included some measure of student behavior. Of these, improvement was seen in student disruptive behavior (Dufrene et al. 2014), task engagement (Rathel et al. 2014), and correct student responding (Sutherland and Wehby 2001). Duchaine et al. (2011) measured on-task behavior in students but found no change.

Service users. Five staff training studies included some measure of service user behavior. Of these, only two reported some improvement following training (Purcell et al. 2000; Zoder-Martell et al. 2014).

Children. All parent training studies included some assessment of child behavior. McIntyre (2008b) and Phaneuf and McIntyre (2011) reported significant improvement in child behavior following parent training. In McIntyre (2008a) parents reported an improvement in behavior, but this was not directly measured. George et al. (2011) also reported some improvement in child behavior. Antonini et al. (2014) reported an increase in compliance following training, but this was the same across experimental and control groups.

Summary of training effects

Fifteen of the 22 studies measured the effects of training on both caregivers and individuals with DD. Of those, eight reported at least some improved outcome for individuals with DD, but five reported no change. Nine reported significant improvement in caregiver outcomes, although results from two of these studies were not maintained. Five of these studies reported mixed results or improvement without experimental design. Only one reported no change in caregiver skills. Seven of the 22 studies measured the effects of training only on caregivers. Of these six reported significant or substantial improvement in skills, although maintenance was not strong in three of them. One reported partial results.

Discussion

A systematic literature review was conducted to investigate the methods used to train caregivers to improve interactions with individuals with DD. For the purposes of this review, caregivers were family members, staff members providing services to individuals with DD, and teachers who had at least one student with a developmental disability in their classrooms. Twenty-two studies, published between the years 2000 – March 2020, met criteria for inclusion in this review. Data were extracted across such variables as training objectives, training methods, experimental methodology, and results.

Types of skills

At least one training objective in all studies was to increase or improve interactions between caregivers and individuals with DD. Training for professional caregivers generally focused increasing positive interactions and/or increasing praise, while the focus for parent training was improved parenting skills, including use of praise. Training content delivered to accomplish these similar goals varied substantially across studies, however. Content was similar across teacher training studies, in that all included praise or behavior-specific praise (BSP) as a topic of training. Slightly more variety was seen in content for staff training, with some

studies including positive interactions with BSP, or a broader focus on various communication and social interaction. The content for parent training was comprehensive, including such topics as play, praise, rewards, limit setting, challenging behavior, and antecedent management.

Given the different content presented to accomplish similar goals, one question that arises is what skills should be taught to improve interactions between caregivers and individuals with DD? With resources at a premium across settings and the increased emphasis on objective results, it is important to establish training goals that will have the highest impact while requiring as few resources as possible.

The teacher training studies and half of the staff training studies included fewer content areas with a strong emphasis on behavior-specific praise. Increasing praise statements can result in interactions that are more positive overall. Praise is an empirically supported technique that has been shown to decrease and prevent challenging behavior (Zoder-Martell *et al.* 2019). In this review, two studies provide evidence of gains for individuals with DD following training on praise, including an increase in student task engagement (Rathel *et al.* 2014) and correct responding (Sutherland and Wehby 2001).

Research supports including praise in caregiver training programs that have a goal to improve interactions and also to decrease or prevent challenging behavior. While praise is an effective element to include in caregiver training, more research is needed to determine whether it is sufficient to improve outcomes of individuals with DD to a meaningful degree.

The parent training studies all included praise as only one of a number of topics covered in training sessions. Overall results were robust in most cases and included improvements in parenting behavior and child behavior. These comprehensive parent training programs were also much longer in duration than the teacher and staff training programs that focused on positive interactions and/or use of praise/BSP, however. Additional research would be beneficial to determine which topics are both necessary and sufficient to generate comparable changes in parent and child behavior. Aside from limited resources, it can be difficult for many parents to commit to long training programs spanning multiple sessions. Identifying necessary content can help improve the efficiency of methods and possibly increase the number of parents who attend.

Training methods

With the heterogeneity of studies and the small sample size, it is difficult to identify the methods most effective in improving caregiver interaction with individuals. A preliminary analysis would suggest that training programs that included *in situ* methods tended to be more

effective than those that did not. Of the studies that used a combination of *ex situ* and *in situ* methods, five evaluated effects of the *ex situ*-only components on behavior and found that *in situ* components were needed to improve performance for some (Phaneuf and McIntyre 2011; Pinter *et al.* 2015) or all participants (Dufrene *et al.* 2014; Finn and Sturmey 2009; Simonsen *et al.* 2010). Additionally, half of the studies in this review that reported only partial or no experimental results used *ex situ* only-methods.

Four studies using only *ex situ* methods did demonstrate significant skill improvements, however. Excluding the brief, self-study format used by Slider *et al.* (2006), the most notable difference between *ex situ*-only training with strong outcomes and those with weaker outcomes was the length of training. The more successful *ex situ* training programs ranged from 24 – 39 h in duration. Those that resulted in less robust findings were conducted in less time, although an exact time frame was not provided in all studies. It is possible that the greater length of time substituted for the lack of *in situ* elements. Results from Antonini *et al.* (2014) provide some support for this hypothesis, in that they reported a positive correlation between the number of training sessions parents attended and the amount of praise statements provided to children. More research is required to investigate these issues.

All studies did include some element of *ex situ* training. *Ex situ* methods may be more convenient, in that larger numbers of trainees can participate in training at the same time. This also allows participants to focus solely on training without diverting attention to their caregiving or other life and work responsibilities.

One potential disadvantage of *ex situ*-only training is that some participants may find it more difficult to generalize new skills to the natural environment. The studies that used only *ex situ* methods used video role plays or modeling, which included either stimuli common to the natural environment and/or multiple exemplars of examples and non-examples of skills. In some cases, performance feedback was also provided. These methods may help increase likelihood of generalization (Stokes and Baer 1977). It is likely that longer training programs included more of these methods, and thus and may have improved outcomes in these studies.

While many of the *ex situ* training curriculum included some combination of role play, video modeling, and feedback, some performance-based *in situ* training that includes practice and feedback with individuals with DD may be needed at least for some participants. Even when *ex situ* components include a range of examples, situations, and stimulus conditions, *in situ* may be particularly beneficial when teaching caregivers to interact with individuals with DD, as interaction requires a second party with whom to interact. *In situ* components allow caregivers to practice and

get feedback while interacting with the people they are being taught to interact with. In addition to improving performance, it may improve generalization and maintenance. Hassan *et al.* (2018) found that *ex situ*-only behavior skills training improved caregiver skills, but *in situ* training was needed for those skills to generalize to the natural environment.

Specific measures of generalization were included in only one study (Keller *et al.* 2005) in this review, thus limiting conclusions that can be drawn. Further research on interaction training should include measures of generalization. In terms of maintenance, studies with the strongest maintenance levels of behavior all included *in situ* training with performance feedback (Duchaine *et al.* 2011, Dufrene *et al.* 2014, Phaneuf and McIntyre 2011; Rathel *et al.* 2014; Zoder-Martell *et al.* 2014). Additionally, participants in two studies were able to maintain performance gains with booster *in situ* feedback sessions (Dufrene *et al.* 2014; Zoder-Martell *et al.* 2014). These two studies also illustrate effective use of data to make training decisions—in this case, enhancing maintenance of skills.

Data-driven training

Training methods that are data-based can be applied systematically and according to the needs of the participants. This can result in strong performance gains. Data-driven training can also increase training efficiency, as caregivers are trained only to the extent that they require. Half of the studies in this review used either criterion-based methods or experimental designs that required close, repeated analysis of data. Data-driven training is more efficient, in that training concludes as soon as the skill is acquired. It can also be more effective, in that training does not conclude before participants demonstrate their proficiency. Further research on this type of approach to teach interaction skills to caregivers would be beneficial.

Social validity

Finally, future research should include robust measures of social validity. Half of the studies in this review included feedback from caregivers on acceptability of methods and/or satisfaction of training outcomes. Results from these surveys were largely positive, indicating that the training methods tended to be acceptable to caregivers and/or that caregivers found the training to be beneficial in some way. Only two studies included an attempt to measure a qualitative assessment of satisfaction from individuals with DD, however.

Feedback from caregivers can provide important information about the acceptability of training methods and the overall benefit of the training program. An equally important measure of the social validity of a caregiver training program, however, is its effect on individuals with DD. When a primary goal of caregiver

training is to improve interactions between caregivers and individuals with DD, some measure of the effect this training has on individuals with DD is warranted. Future interaction training goals can be driven, in part, by results of subjective measurement such as was used in Realon *et al.* (2002) and Vanono *et al.* (2013).

Another important measure of social validity of caregiver training is an objective measure of behavior of the individuals with DD following training. Training programs should not only improve caregiver performance but also result in some improvement for individuals with DD. Only half of the studies in this review included a measure of the effect of caregiver training on individuals with DD with some objective assessment of behavior (e.g. challenging behavior, task engagement). Future research should include at least some measure of effect of training (either objective or subjective) on individuals with DD.

Limitations

This review represents an initial attempt to compare training of interaction skills across three different types of caregivers in an attempt to identify variables that contribute to improved interaction skills, positive effects on individuals with DD, and maintenance of intervention gains. There are five main limitations to note. (1) The number of studies that met criteria was small and the studies were extremely heterogeneous making comparisons difficult. Additionally, not all treatment methods were discussed in sufficient detail to allow for thorough comparison. Treatment integrity was discussed in only eight studies, so it also difficult to assess the extent to which training methods were implemented as described. (2) The inclusion of studies with weak experimental designs limited strong conclusions about the effects of the training programs. Conversely, the small number of studies, relatively large number of small-n group and single-subject designs limit external validity. Clearly, further research in this area is needed before stronger conclusions can be made. (3) Search parameters were restrictive. Limiting articles to those focusing on caregivers of individuals with DD resulted in the elimination of a number of studies that may have provided insight into some of the issues raised in this review. Including caregivers of individuals with emotional-behavioral disorder (EBD) or children at risk for EBD would have expanded the results, possibly yielding relevant data. Similarly, including studies that trained caregivers on interaction skills as a means to improve challenging behavior (e.g. Parent-Child Interaction Therapy (PCIT)) rather than just to improve interactions may have also increased the amount of studies to analyze. For example, PCIT includes *in vivo* techniques that may provide more data from which to draw conclusions about relative effect of *in vivo* methods. (4) Many of the articles reviewed did not provide

gender distribution or specific information on functioning level for individuals with DD. These data gaps precluded meaningful analysis of the possible impact of these variables on outcomes. (5) While attempts were made to conduct a systematic review of the literature, it is possible that articles were inadvertently overlooked and thus, not included in this review.

Conclusion

The ways in which caregivers interact with individuals with DD can affect care, skills, and quality of life. In spite of the heterogeneous goals, methods, and methodologies, the studies included in this review provide support for caregiver training on interactions as one way of improving parenting skills, quality of interactions, and specifically, use of behavior-specific praise. While this review did not definitively identify variables associated with improved training outcomes, there is evidence to suggest that, at least for some caregivers, some aspect of in vivo training is needed where caregivers can learn skills while interacting with individuals with DD. Data-driven training is recommended to determine caregiver's response to training and ongoing individual training needs. Further research is warranted to determine the most effective and efficient training content and methods and their impact on individuals with DD.

Acknowledgements

I wish to thank Cheryl Davis and Kathy Kennedy-Brill for their invaluable insight and feedback as I was writing this paper. I also thank Peter Sturmey for inspiring me towards this particular topic. I thank my husband for sharing homeschool responsibilities during the COVID-19 crisis so this paper could be completed. Finally, I thank Brian Salmons and Arturo Langa for their patience and support.

Disclosure statement

The author reports no conflict of interest.

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