A Comprehensive Review of Wraparound Care Coordination Research, 1986 - 2014

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Full reference list: For a full list of articles included in this review, please see this article archive's addendum on the National Wraparound Initiative's website: nwi.pdx.edu.

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Abstract

Wraparound is a team-based care coordination strategy for children and youth with complex behavioral health needs and their families. Despite widespread adoption, a review of the literature pertaining to Wraparound has not previously been conducted. To address this gap, we conducted a comprehensive review, ultimately identifying 206 unique Wraparound-related publications in peer-reviewed outlets. We then coded and analyzed the publications' methods, main foci, measures, and findings. Eighty-three publications (40%) were non-empirical, most of which focused on defining Wraparound and advocating for its use, largely based on its alignment with the System of Care philosophy. Among empirical studies (n=123; 60%), 22 controlled studies were found, most finding positive or mixed evidence for Wraparound's effectiveness. Other empirical studies examined implementation issues such as necessary system conditions and measurement and influence of fidelity. Major gaps include rigorous tests of Wraparound's change mechanisms, workforce development models, peer support, and the use of specific treatments. We conclude that literature produced to date has provided useful information about Wraparound's core components, program- and system-level implementation supports, and applicability across systems and populations, as well as preliminary information about effectiveness and cost-effectiveness. The Wraparound research base would, however, benefit from additional studies of the model's intervention and implementation components, as well as more rigorous effectiveness studies.

Keywords: Wraparound; care coordination; literature review; children's mental health; systems of care

Introduction

Research suggests that approximately 20% of all children and adolescents in the United States have a diagnosable mental health disorder, at an annual cost of $247 billion (Institute of Medicine & National Research Council, 2009). At the same time, however, research also shows that 75%-80% of young people who need behavioral health services do not receive them (Kataoka, Zhang, & Wells, 2002).

A primary driver of this gap between need and help is that public child-serving systems disproportionately allocate their scarce resources to youth with the most serious and complex problems, reducing opportunities to invest in prevention and early identification and treatment. Approximately 10% of youth with the most serious and complex behavioral health needs consume 40% - 70% of all child-serving resources (Bruns et al., 2010; Center for Health Care Strategies, 2011, March; Pires, Grimes, Allen, Gilmer, & Mahadevan, 2013). Much of this imbalance in expenditure is accounted for by use of congregate and institutional care settings for youth with serious emotional and behavioral disorders (SEBD), despite persistent concerns about the capacity of such care strategies to promote generalizable improvements in youth symptoms or functioning (Barth, 2002; Burns, Hoagwood, & Mrazek, 1999; Curtis, Alexander, & Lunghofer, 2001; R. A. Epstein, Jr., 2004; U.S. Department of Health and Human Services, 2003; United States Public Health Service, 1999).

To address the imbalance in resource allocation and improve outcomes for youth with SEBD, states, jurisdictions, and provider organizations have invested in intensive, multi-modal interventions that include manualized evidence-based treatments (EBT) such as Functional Family Therapy (FFT; Alexander & Sexton, 2002), Multisystemic Therapy (MST; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998), and Multidimensional Treatment Foster Care (MFTC; Chamberlain, 2003). These types of approaches have been shown to be capable of addressing the complex needs of these youth and their families (Bruns & Hoagwood, 2008; Tolan & Dodge, 2005; U. S. Surgeon General, 2001), as well

as reduce overall costs of care due to prevention of out-of-community placement in settings such as psychiatric hospitals and residential treatment centers (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004) .

Despite their proven research base, however, uptake of these EBTs into public behavioral health systems has been slow and penetration rates low (Bruns et al., 2015). Several barriers to adoption have been consistently cited. First, research suggests that manualized EBTs may have limited generalizability to the full range of youth with intensive, multi-system needs (Daleiden & Chorpita, 2005; Southam-Gerow, Chorpita, Miller, & Gleacher, 2008; Weersing & Weisz, 2002), a concern increasingly cited as something that must be addressed by service systems (Chorpita, Bernstein, & Daleiden, 2011). Research has also found challenges to building multiple EBTs into an accessible service array (Chorpita, Daleiden, et al., 2011), unfavorable provider attitudes toward EBTs (Borntrager, Chorpita, Higa-McMillan, & Weisz, 2009), and high organizational costs (Chorpita, Becker, & Daleiden, 2007; John R. Weisz et al., 2012).

As an alternative to manualized interventions for specific problem areas (e.g., MST for juvenile offending), public systems have tended to be more likely to invest in care management strategies and integrated service models for youth with multiple and complex needs, such as intensive case management (Burns, Farmer, Angold, Costello, & Behar, 1996) and the Wraparound process (Walker & Bruns, 2006b). These models have fewer exclusionary criteria than most EBTs, are more readily reimbursed by Medicaid, and hold the potential to be deployed as an "operating system" for providing individualized care across child-serving agencies, enabling their use as a broad system strategy with greater applicability than one—or even multiple—EBTs (Bruns, Walker, Daleiden, & Chorpita, 2013). Such models are also non-proprietary and locally adaptable, enhancing flexibility and appeal among system administrators and providers. In addition, such strategies can co-exist with, if not enhance, EBTs by coordinating EBTs and other services and providing follow-on support after such time-limited interventions have ended (Bruns, Walker, et al., 2013; Friedman & Drews, 2005).

Wraparound, specifically, is a defined, team-based process for developing and implementing individualized care plans to meet the complex needs of youth with SEBD and their families. The model has been used in states and communities across the U.S. for at least 30 years (VanDenBerg, Bruns, & Burchard, 2003), and is now implemented in nearly every state and in several other countries (Bruns, Sather, Pullmann, & Stambaugh, 2011). In addition to Wraparound's practical appeal, its growth has been encouraged by the federal government's endorsement—and widespread adoption—of the System of Care philosophy which promotes use of community-based care management for youth with multi-system involvement and/or complex needs (Stroul & Blau, 2010). Moreover, core values of the System of Care philosophy, such as being family-driven, youth-guided, community-based, and culturally and linguistically-competent, align well with Wraparound's principles (Stroul, 2002).

Further indicators of Wraparound's increasing advancement include it being listed on several evidence-based practice inventories, including both the Oregon and Washington State registries (e.g., Washington State Institute for Public Policy, 2012) and California Evidence-Based Clearinghouse for Child Welfare. Several class-action lawsuit settlements focused on Medicaid beneficiary youth with SEBD also encourage or mandate use of Wraparound-adherent care management (Bruns, Walker, et al., 2014), as did the federal government's nine-state Community Alternatives to Psychiatric Residential Treatment Facilities (PRTF) Demonstration Grant Program that allowed states to divert inpatient treatment dollars to install community-based programs (Urdapilleta et al., 2012). Moreover, a joint bulletin from the Center for Medicaid Services (CMS) and Substance Abuse and Mental Health Services Administration (SAMHSA; 2013) was recently issued encouraging states to use federal funding mechanisms to implement Wraparound and other community-based services for youth with SEBD.

As more and more communities have adopted the model, and more federal funding mechanisms have supported its implementation (Center for Health Care Strategies, 2011, March),

Wraparound implementation nationally has become better operationalized and supported. In the past decade, researchers, practitioners, and funding agencies have coalesced around a set of definitional documents and resources formally articulating the model's principles, tasks, and activities (Walker, Bruns, Conlan, & LaForce, 2011), providing guidance about practice, implementation, and evaluation (Bruns, Walker, & Group, 2008). Wraparound's increasing model specification has allowed for the development of fidelity measures with national norms and quality indicators (Bruns, Suter, & Leverentz-Brady, 2008; Walker et al., 2011; see www.nwi.pdx.edu) and the pursuit of more rigorous research studies (e.g., Bruns, Pullmann, Sather, Brinson, & Ramey, 2014). Definitional work has also facilitated standardized workforce development approaches, including training and coaching, and has supported increasingly formalized implementation and performance monitoring infrastructure on the ground (Walker & Matarese, 2011).

The evidence base for Wraparound has grown commensurately with its adoption in the field. In 2009, Suter and Bruns conducted a meta-analysis of outcome studies that found significant effects of Wraparound on four key outcome domains, including the youth's living situation, behavior, functioning, and community adjustment. That review, however, was focused only on controlled (experimental or quasi-experimental) studies and yielded only seven publications that met inclusion criteria (later updated to nine; Bruns & Suter, 2010).

Thus, over six years have passed since the last review of outcomes studies of Wraparound, and to date, a comprehensive review of the full Wraparound research literature has not been conducted. Such gaps in the literature raise a range of questions: Have any new controlled outcomes studies been published since 2009, and what are their results? For research studies not focused on controlled studies of efficacy or effectiveness, what are they examining? What conclusions can be drawn from the current research base about critical issues such as target population, treatment elements, mechanisms of effect,

implementation drivers, family and youth perceptions, and costs? Where does the Wraparound literature need to go in the next 25 years to support model refinement, implementation support, and the overall evidence base?

With these questions in mind, we set out to narratively review, code, and describe the published literature on Wraparound between 1986, when the term "Wraparound" was reportedly first used to describe a service model (VanDenBerg et al., 2003), through the end of 2014. Our aims were to: 1) thematically categorize Wraparound publications by study foci, purpose, research design, measures, and rigor; 2) synthesize and describe any patterns or trends in research studies and findings over time; 3) highlight potential implications from the existing research; and 4) identify needed areas of further study.

Method

In order to locate as many relevant publications as possible, our review extended from 1986, when the term "Wraparound" was reportedly first used (VanDenBerg et al., 2003), through 2014. This 28-year review period was divided into approximately 5-year increments to make the search manageable and highlight trends. The literature search was conducted from July 2014 to March 2015.

Review Sources

"Literature" was defined broadly to include articles in peer-reviewed journals, unpublished dissertations and theses, and books and book chapters. Book reviews, monographs, and conference presentations were excluded as they are not systematically available through online search engines and are often held to lower standards than peer-reviewed materials. Only English-language publications were included. Search engines used included PsycINFO, Web of Science, Medline, Social Work Abstracts, and ERIC. It was determined that these search engines would provide the largest scope for publications related to the fields of psychology and social sciences.

Inclusion Criteria and Search Terms

A keyword search was performed with terms such as ("Wraparound") AND ("Wrap-Around" OR "Wrap Around") AND ("Wraparound Services") AND ("Wraparound Process") AND ("Intensive Community-based Services") AND ("Intensive Care Management"). It was necessary for the search terms to remain broad, since, as a practice-based movement not promoted by a single developer or research team, Wraparound has been referred to using a variety of terms and spellings. Additionally, the process or approach to delivering services has been malleable, hence the need to include search terms such as "Intensive Care Management" that may have been used interchangeably with Wraparound in certain Systems of Care.

Coding Process

The publications were reviewed and coded by the first and third authors, who are familiar with the Wraparound process and children's mental health interventions. All codes were dichotomous, yes/no variables and developed prior to coding. Publications were first coded as empirical or non-empirical. Non-empirical publications' type was further coded using three mutually exclusive codes, including thought piece, commentary, and literature review. Empirical publications were further categorized in six areas, each with a set of mutually exclusive codes; the areas included empirical type (five codes), timeframe (two codes), empirical purpose (five codes), type of data (three codes), measures used (one code), and measurement time point (two codes). In addition, all publications were coded on four non-exclusive system context variables and twenty non-exclusive topical foci based on their content. When the primary coding was complete, a check for inter-rater reliability was conducted on 15% of the sample. A Kappa coefficient of 0.83 across all 48 codes was found, indicating a strong level of agreement (McHugh, 2012). Once initial coding was concluded some variables, such as measures used, were further categorized to allow for easier presentation of frequencies.

Results

Characteristics of Publications

Sample. A total of 691 publications were initially identified; 375 duplicate publications were removed based on matching titles, leaving 316 unique publications. An additional 104 publications were excluded during the abstract review and coding process because they only generically discussed Wraparound as a concept or they applied it to populations other than children and youth with SEBD. Six more dissertations, theses, and book chapters were excluded after determining they presented the same empirical findings as a peer-reviewed journal article; in these cases, the journal article was retained. Removing duplicate and non-relevant publications yielded 206 publications included in this review. Figure 1 summarizes the search process and results based on the PRISMA guidelines (see prisma-statement.org).

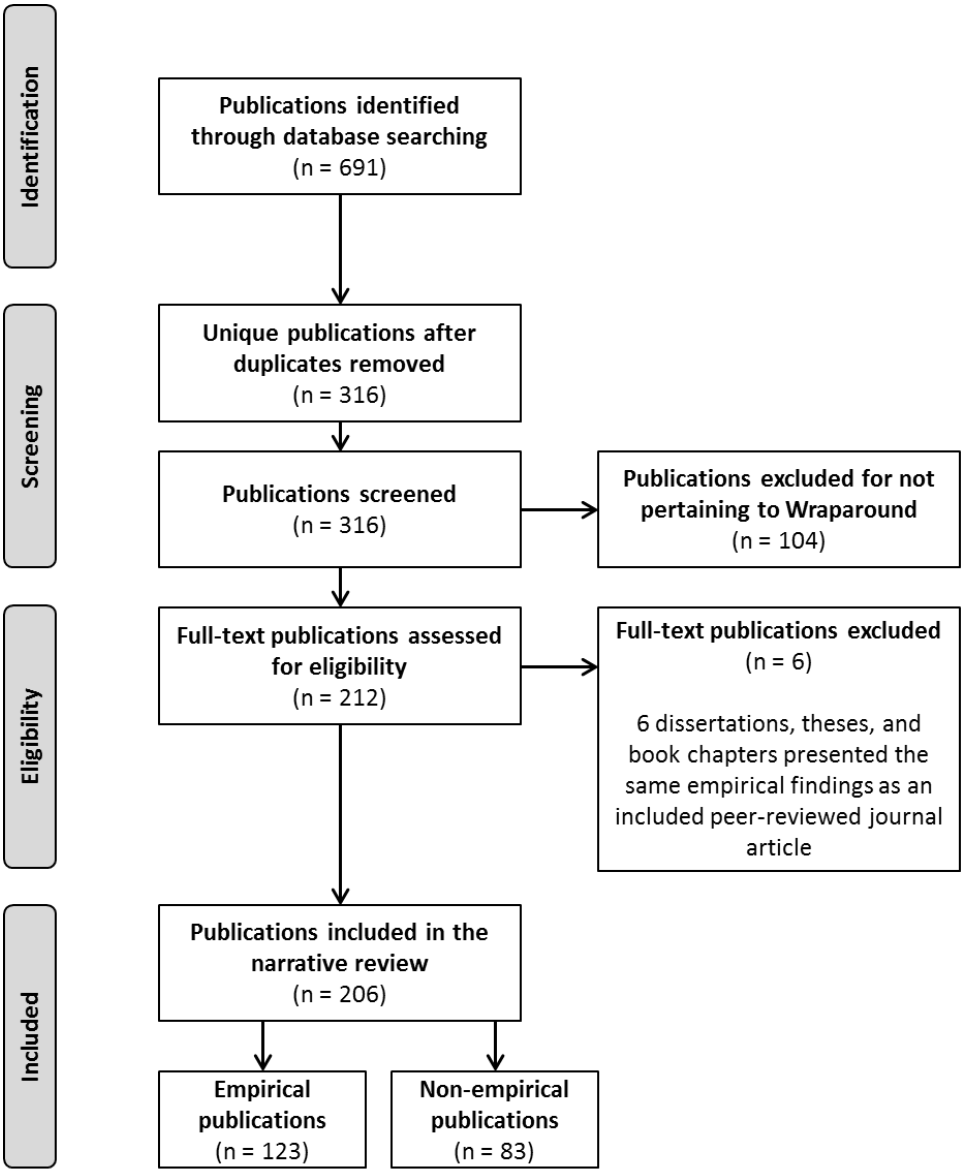

Figure 1. Results of database, abstract, and full-text screening

The results that follow do not cite nor do references include all 206 studies found. However, a reference list of all 206 studies, organized by the categories presented below, can be found at the website of the National Wraparound Initiative (NWI), at www.nwi.pdx.edu. Of the 206 unique publications, 76.2% (*n* = 157) were peer-reviewed journal articles, 12.1% (*n* = 25) were books or book chapters, and 11.7% (*n* = 24) were dissertations or theses.

Publication rate. No publications on Wraparound were found before the year of 1990. The first peer-reviewed publication on Wraparound was an evaluation of Project Wraparound in Vermont by Burchard, Clark, Hamilton, and Fox (1990). Only five publications total were found for 1990-1995. However, from 1996-2009 a mean of 8.6 (*SD* = 2.4; range = 4-12) Wraparound-related publications were published each year. The mean number increased to 15.4 (*SD* = 3.9; range = 10-21) publications per year from 2010-2014. Growth in the Wraparound literature was punctuated by two special issues of the *Journal of Child and Family Studies* in 1996 and 2011. Figure 2 illustrates the number of annual and cumulative number of Wraparound-focused publications over time.

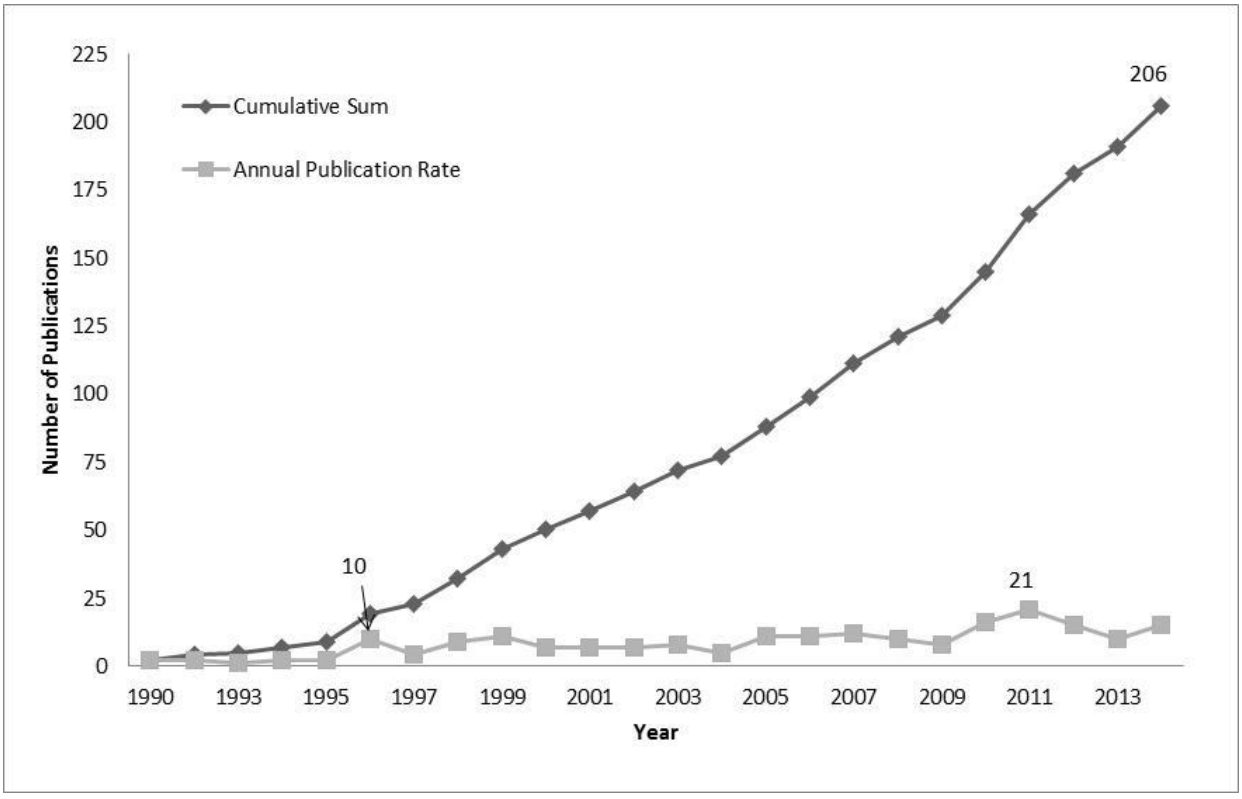

Figure 2. Annual and cumulative number of total publications about Wraparound

Topical foci. To assess which aspects of the Wraparound process have been most thoroughly explored, the main topics addressed by the 206 publications were coded using 12 non-exclusive topical categories. The categories were developed prior to and during coding by the research team based on

their knowledge and expectations of what was in the literature, as well as the aims of the current narrative review. As shown in Table 1, a plurality of publications (*n* = 84; 40.8%) focused on *defining or specifying the Wraparound process*—for example, its purpose, potential usefulness, principles, and practice model—and/or promoting its implementation. The rate of publications of this type has been steady, at about three or four per year, for the past 20 years.

Table 1. *Publication Foci (N = 206)*

	N	*%*
Define Wraparound or argue for its need/usefulness	84	40.8%
Examine how Wraparound impacts client outcomes (i.e., effectiveness)	77	37.4%
Youth functioning (interpersonal, academic, criminality)	63	30.6%
Service usage	29	14.1%
Youth's living situation (stability, restrictiveness, etc.)	26	12.6%
Family functioning	21	10.2%
Client satisfaction	12	5.8%
Youth engagement in the Wraparound process	6	2.9%
Explore or advise on aspects of Wraparound implementation (training, funding, structure, etc.)	50	24.3%
Delineate or measure Wraparound fidelity	37	18.0%
Compare Wraparound to other approaches for SEBD youth	31	15.1%
Measure the cost or cost effectiveness of Wraparound	17	8.3%
The use of peer supports	3	1.5%

Note. Counts and percents are non-exclusive; publications could be coded into more than one category.

Almost two-fifths (*n* = 77; 37.4%) examined how Wraparound impacts *client outcomes*, including youth functioning (i.e., symptoms and behaviors, community functioning, academic success, criminality, interpersonal interactions, etc.; *n* = 63; 30.6%), service usage (*n* = 29; 14.1%), youth's living situation (*n* = 26; 12.6%), family functioning (*n* = 21; 10.2%), client satisfaction (*n* = 12; 5.8%), and/or youth engagement in the Wraparound process (*n* = 6; 2.9%). An additional 49 (23.8%) focused on *Wraparound implementation* (e.g., training, funding, system structure) and 37 (18.0%) were on the topic of *defining or measuring fidelity* to the Wraparound model. Other topics with relatively high numbers of publications included *comparisons of the Wraparound philosophy and approach to other intervention*

approaches for youth with SEBD (*n* = 31; 15.1%), and *costs* associated with Wraparound service provision (*n* = 17; 8.3%). The use of *peer supports* was the focus of three (1.5%) publications.

Publication type, methods, and measures.

***Non-empirical publications*.** Approximately 40% (*n* = 83) of all publications in the sample were not empirical in nature. Non-empirical publications can be described as presenting no or extremely limited original data or evidence, or only anecdotal evidence. Almost 80% (*n* = 66) of the non-empirical publications found were descriptive or "thought pieces," such as publications that explored the theory base for Wraparound, presented options for adapting or applying Wraparound to special populations or contexts, argued for the fit between a population's needs and various intervention models, presented a theory of change, or provided definitions and descriptions of a practice model. About 11% (*n* = 9) of the non-empirical publications were commentary on previously published articles, and 9.6% (*n* = 8) were literature reviews, although none was a comprehensive review of the Wraparound literature. Table 2 shows additional details of this breakdown.

Table 2 *Summary of Publication Format, Type, Method, and Context (N = 206)*

	N	*% of All Publications*	*% of Publication Subtype*
Publication Format			
Peer-reviewed Journal Article	157		76.2%
Book or Book Chapter	25		12.1%
Dissertation or Thesis	24		11.7%
Non-empirical Publications	83	40.3%	
Type			
Thought Piece	66		79.5%
Commentary	9		10.8%
Literature Review	8		9.6%
Empirical Publications	123	59.7%	
Method			
Experimental	7		5.7%
Quasi-Experimental	15		12.2%
Non-experimental (open trial or pre-post)	58		47.2%
Case Study	27		22.0%
Descriptive	16		13.0%
System Context			
Community/System of Care	77		62.6%
Schools	19		15.5%
Child Welfare	12		9.8%
Juvenile Justice	8		6.5%
Multiple/Other/Not specified	7		5.7%

Four of the literature reviews found had narrow Wraparound-specific foci, including Wraparound implementation (Bertram, Suter, Bruns, & O'Rourke, 2011), Wraparound's effectiveness (Walter & Petr, 2011), integration of evidence-based treatments (Bruns, Walker, et al., 2014), or application to drop-out prevention (Martin, Tobin, & Sugai, 2002). The other four reviews (Bradley, 2005; Burns, Schoenwald, Burchard, Faw, & Santos, 2000; Flash, 2003; Maluccio, Ainsworth, & Thoburn, 2000) synthesized and compared literature pertaining to multiple community-based interventions for high-needs and child-welfare-involved youth, and included Wraparound.

***Empirical publications*.** The other 60% (*n* = 123) of all publications found were empirical in nature, meaning they presented original data based on observed and measured phenomena and derived knowledge from actual experience rather than from theory or reflection. Only seven (5.7%) of the empirical studies used experimental methods (i.e., randomization to Wraparound and a comparison group). Another 15 publications (12.2%) used a quasi-experimental design featuring some sort of comparison group, but the vast majority (82.1%) of empirical publications found in our search did not compare groups and/or rigorously approach data collection. Almost half (*n* = 58; 47.2%) of the empirical publications were non-experimental, 22% (*n* = 27) presented in-depth case studies, and another 13% (*n* = 16) were simply descriptive (i.e., presented some original data, but did not set out to test a hypothesis) (see Table 2). Many (*n* = 29; 28.7%) of these less rigorous publications had the aim of describing a Wraparound initiative. These pieces often featured both an argument for the appropriateness or effectiveness of Wraparound, coupled with a description of the initiative's population and some basic outcome measures, such as system-level change in hospitalization rate or within-group longitudinal improvement on a standardized scale of functioning.

Measurement. By definition, all of the empirical publications used some sort of systematic measurement approach. The majority (*n* = 77 of 123; 62.6%) used only quantitative measures, such as standardized instruments or administrative data, while a small subgroup (*n* = 18; 14.6%) relied solely on qualitative tools, such as interview protocols or observation. The remaining 28 (22.8%) publications used mixed methods to achieve their empirical aims. About half of the studies (*n* = 63; 51.2%) repeated measurement at least once to assess change over time. Table 3 provides more detail.

Table 3. *Measures used in Empirical Studies (N = 123)*

	#	%
Quantitative Measures	105	85.4%
Qualitative Measures	46	37.4%
Standardized Instruments	75	61.0%
Child and Adolescent Functional Assessment Scale (CAFAS)	23	18.7%
Child Behavior Checklist (CBCL)	21	17.1%
Restrictiveness of Living Environments Scale (ROLES)	11	8.9%
Youth Self-Report (YSR)	5	4.1%
Study-specific Measures	43	35.0%
Interview of Focus Group Protocol	16	13.0%
Satisfaction	14	11.4%
Fidelity Assessment Tools	37	30.1%
Wraparound Fidelity Index (WFI)	19	15.5%
Wraparound Observation Form (WOF)	7	5.7%
Administrative Data	24	19.5%
Repeated Measures	63	51.2%

Note. Counts and percents are non-exclusive; publications could be coded into more than one category.

Seventy-five empirical studies (61.0%) used at least one standardized measure, 43 (35.0%) used at least one tool developed specifically for their study, such as an interview protocol or satisfaction questionnaire, and 24 (19.5%) studies utilized administrative data such as arrest records, school data, or case files. Standardized measures were most often used to assess youth functioning. The most commonly used tools were the Child and Adolescent Functional Assessment Scale (CAFAS; *n* = 23; 18.7%) and the Child Behavior Checklist (CBCL; *n* = 21; 17.1%). Nine (7.3%) studies used both the CAFAS and the CBCL. The Youth Self-Report (YSR), a parallel tool of the CBCL geared for youth over 11 years old, was also used in five (4.1%) studies. The Restrictiveness of Living Environment Scale (ROLES) was used in 11 studies (8.9%) to assess a youth's living arrangements.

Setting or system context. The majority of empirical publications (*n* = 77 of 123; 62.6%) focused on Wraparound being delivered within a community context, most often as part of a public mental health initiative. However, 15.5% (*n* = 19) focused on Wraparound implemented in a school setting. Almost 10% (*n* = 12) of the studies were of Wraparound initiatives targeted at youth involved with the

local child welfare agency, and 6.5% (*n* = 8) specifically targeted youth involved in the juvenile justice system. Seven publications (5.7%) either did not specify the context or took place in multiple or other contexts (see Table 2).

Summary of Findings in Each Focal Topic

In addition to classifying and describing the nature of Wraparound literature over the past almost three decades, we also sought to summarize the "weight of the evidence" for each of the focal topics provided by the publications in this review. We chose to present findings from the empirical literature only since these publications, by definition, focused on production of generalizable knowledge for the field, the synthesis of which could help determine what is known, as well as implications for decision making and needs for future research. We chose not to summarize studies aimed at further defining the Wraparound model, as the NWI and other groups have previously provided similar information (see http://nwi.pdx.edu/Wraparound-basics/). Below, we summarize findings for the other five major categories of research found; specifically, client outcomes (including in comparison to those achieved by other interventions), cost-effectiveness, Wraparound fidelity, Wraparound implementation, and use of peer supports.

Client outcomes. Seventy-one (57.7%) of the empirical publications found examined Wraparound's impact on client outcomes in the areas of youth's functioning, living situation, engagement, and/or satisfaction, family's functioning and/or satisfaction, and/or changes in service usage or access.

***Controlled studies*.**

Experimental studies. All of the experimental studies found (*n* = 7) examined outcomes of youth and families enrolled in Wraparound. One measured outcomes achieved by two variants of Wraparound; Ogles et al. (2006) compared 60 youth, all of who were receiving Wraparound services,

but half of whose teams received routine feedback about the youth's progress on several standardized outcomes measures. They found that Wraparound resulted in improved functioning and decreased problematic behaviors for youth who had clinically-significant problems at enrollment, regardless of whether or not their team received enhanced feedback. The other six experimental publications rigorously compared Wraparound's outcomes to those of another approach, such as "conventional juvenile justice services" (Carney & Buttell, 2003), "usual foster care services" (Clark, Lee, Prange, & McDonald, 1996), or "traditional intensive case management" (Bruns, Pullmann, et al., 2014).

Two of the six experimental effectiveness studies found no difference between groups. Deaner's (1998) dissertation found no difference between a small group of 3-5 year olds attending a partial hospitalization program, some of whom also received Wraparound services. Bruns et al. (2014) found no group differences between child-welfare-involved youth with SEBD receiving traditional intensive case management versus "Wraparound" on measures of residential restrictiveness, behavioral health symptoms, or functioning. However, because the study systematically measured fidelity for both groups, it was able to highlight the fact that, in this particular study, Wraparound adherence and organizational climate and culture of the Wraparound-implementing organization was poor, placing a strong caveat on the null findings and highlighting the need for higher-quality implementation in the field and measurement of fidelity and system context in research studies (Bruns, Pullmann, et al., 2014).

The other four experimental studies (Aboutanos et al., 2011; Carney & Buttell, 2003; Clark et al., 1996; Ferguson, 2005) found significant between-group differences, with Wraparound youth faring better on functional and residential outcomes, such as being suspended less often, using more community services, not running away as frequently, living in a lower level of restrictiveness, and achieving permanency more often. However, while the "weight of evidence" of these four studies was in

favor of Wraparound, findings for more distal outcomes, such as rate of arrests, incarcerations, and placement in foster care, were often null or mixed.

Quasi-experimental studies. Thirteen quasi-experimental Wraparound effectiveness studies were found, six (46.2%) of which were doctoral dissertations. Six (46.2%) studies found more positive outcomes for the Wraparound group on some, but not all outcomes of interest, compared to the comparison group, with no outcomes in favor of the comparison group (Eber, Osuch, & Redditt, 1996; Mears, Yaffe, & Harris, 2009; Patton, 2008; Skarlinski, 2013; Stambaugh et al., 2007; Walton, 2007).

One study by Bickman, Smith, Lambert, and Andrade (2003) found no differences between groups; however, it is worth noting that the comparison group consisted of families who had rejected participation in Wraparound or did not meet the eligibility criteria, leading to a weak comparison group. Furthermore, the authors also found no significant differences between Wraparound and comparison groups on a fidelity measure, and went so far as to say that "there is no evidence that the content or the quality of the services were different for the Wraparound children" (pg. 151), calling into question whether the program being evaluated was Wraparound in name only (Suter & Bruns, 2009).

Only one study found that Wraparound slightly worsened youth's outcomes (Karpman, 2014), although this finding pertained to when Wraparound was added to pre-existing behavioral health services. This is not common practice, and may indicate youth in the Wraparound group presented with more severe or complex needs that triggered an overlay of Wraparound services (and resulted in non-equivalence of groups). A further five of the quasi-experimental studies (Csokasy, 1998; Grimes et al., 2011; Jeong, Lee, & Martin, 2014; Mears, 2005; M. D. Pullmann et al., 2006) found that Wraparound produced consistent, significantly more positive results for youth in all major areas assessed. These areas included criminal recidivism, living situation, hospitalizations, and clinical functioning.

While the uniformly positive findings presented in these publications, combined with other mixed findings, suggest that the "weight of evidence" from quasi-experimental studies supports Wraparound's effectiveness, these studies, by nature, exhibit less internal validity than randomized studies; results may thus have been driven as much by confounds—such as historical effects that were not able to be addressed by statistical controls—than outcomes caused by the intervention itself.

Limitations to controlled studies' findings. Conclusions from extant research about Wraparound's effectiveness are tempered by a lack of fidelity measurement and/or "thick descriptions" of the specific model employed, and often, for controlled studies (experimental and quasi-experimental), a failure to demonstrate a different between the intervention received by the treatment and comparison groups. Among the 19 controlled studies evaluating Wraparound's effectiveness, only four (21.0%) systematically measured fidelity to the Wraparound model, all with some version of the Wraparound Fidelity Index (Michael D. Pullmann, Bruns, & Sather, 2013). Of these, three presented data to demonstrate that the services provided to the Wraparound group met at least basic standards of fidelity; one found that Wraparound produced significantly better clinical and functional improvements (Mears, 2005), and two found mixed (some positive, some null) results compared to treatment as usual or MST (Ferguson, 2005; Stambaugh et al., 2007). Additionally, Bruns et al. (2014) used fidelity data collected in a randomized trial to facilitate the conclusion that there were no differences between youth receiving poorly-implemented Wraparound and youth receiving child welfare services as usual.

Furthermore, none of the experimental studies comparing Wraparound's effectiveness to another model or treatment as usual took place within a public behavioral health system of care, the context in which Wraparound is most often implemented. Three took place within a child welfare context, one explored Wraparound's impact when implemented within the juvenile justice setting, and the remaining two publications examined somewhat novel applications of Wraparound within hospital

settings. Likely because of its increased feasibility compared to experimental designs, the majority (n=7; 53.9%) of the thirteen quasi-experimental publications focused on evaluating Wraparound's effectiveness were conducted within a community setting, in addition to three (23.1%) studies conducted within child welfare and two (15.4%) in juvenile justice.

***Non-experimental studies*.** Almost half (*n* = 34; 47.9%) of the empirical studies focusing on client outcomes did not employ an experimental design, but rather qualitatively explored client outcomes or quantitatively compared the functioning of Wraparound participants (and sometimes their families) to themselves pre- and post-service engagement, typically after 6 or 12 months. Occasionally, more global system-level performance was evaluated. On the whole, findings from these studies support the hypothesis that Wraparound is effective in ameliorating at least some of the issues with which youth and their families often present.

Of note because of its rigor is Painter's 2012 paper that presented findings from a longitudinal (enrollment through 24 months) repeated measures (every 6 months) study of 160 Wraparound-enrolled youth and their caregivers. Painter's well-designed study used a battery of standardized youth mental health and functioning, caregiver strain, and fidelity measures, and featured strong analyses and calculation of effect sizes. Based on all of the measures completed by caregivers (but not the youth's self-report), Wraparound youth achieved significant and clinical levels of improvement in mental health symptoms and behavioral and emotional strengths; furthermore, caregivers reported significantly less stress at 6 months, an improvement that was maintained throughout the 24-month data collection.

***Case studies and descriptive studies*.** Case studies examining client outcomes constituted two-fifths (*n* = 14) of the empirical outcome studies. These publications examined a diverse array of client outcomes, and were almost universally positive. One especially rigorous case study was conducted by Myaard, Crawford, Jackson, and Alessi (2000). They administered the Daily Adjustment Indicator

Checklist (DAIC) every day and the Child and Adolescent Functional Assessment Scale (CAFAS) quarterly to four Wraparound-enrolled youth for one year, including between three and five months of baseline, before Wraparound services began. Myaard et al. found Wraparound to have significant sequential effects on multiple problem behaviors that were immediately achieved and maintained over time. While limited to only four youth, this type of multiple baseline case study design provides compelling evidence of Wraparound's potential impact.

The remaining three (4.2%) empirical publications described or categorized Wraparound youth or their outcome trajectories, but didn't necessarily argue that Wraparound impacted these outcomes (Bullis & Cheney, 1999; Malloy, Drake, Abate, & Cormier, 2010; Nash, Thompson, & Kim, 2006).

***Wraparound versus other EBTs*.** While 31 (15.1%) of all the publications reviewed compared Wraparound to other specified approaches to help youth with SEBD, less than half of these (*n* = 13; 41.9%) reported empirical findings. The rest of the comparative publications were thought pieces or literature reviews that presented extant research about various approaches side-by-side without a direct quasi-experimental or experimental comparison.

Only one empirical study (Stambaugh et al., 2007) directly compared outcomes for Wraparound to a defined practice model. The other 12 empirical comparative studies (described above) evaluated outcomes for youth in Wraparound compared to youth receiving "traditional services," most often (*n* = 7; 58.3%) within a child welfare or juvenile justice setting (i.e., they did not compare Wraparound to another EBT). In 2007, Stambaugh et al. used federal evaluation data from a single system of care to compare the outcomes of 320 youth who received Wraparound (*n* = 213), MST (*n* = 54), or *both* MST and Wraparound (*n* = 53). They found that all youth improved during the study period, but that youth receiving MST only had greater improvement in emotions and behaviors, as measured by the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001). No significant difference between Wraparound

and MST was found for youth functioning, as measured by the Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 2004). It is important to note, however, that the groups were not equivalent at baseline, with the MST condition only including youth who were eligible for that specific intervention, while all other youth with SEBD were served by Wraparound.

Cost effectiveness. Seventeen publications were found that discussed the service cost or cost effectiveness of the Wraparound approach, 11 (64.7%) of which were empirical. Of these 11 publications, none were experimental. Two (18.1%) were quasi-experimental. Grimes et al.'s 2011 study found that youth enrolled in Wraparound had nearly half the per member per month claims expenses than age-matched counterparts with SEBD in a "usual care" group. Despite youth in Wraparound utilizing more outpatient mental health services and spending more on pharmacy claims, costs of those services were offset by the fact that they had 94% fewer pediatric inpatient admissions than the matched comparison group, and 73% lower inpatient psychiatry expenses than the matched comparison group. In addition to substantial cost savings, youth enrolled in Wraparound also achieved statistically and clinically significant improvement in behavioral and functioning, as measured by the CBCL, CAFAS, and Children's Global Assessment Scale (CGAS; Shaffer et al., 1983). Unfortunately, these measures were not also collected for youth in the comparison group. It is important to note that the Massachusetts program evaluated by Grimes et al. (2011) was Wraparound implemented within a care management entity (CME), an organization tasked with monitoring and managing system-level outcomes and costs. Thus, it could be reasoned that this implementation model may be more capable of reducing costs than a stand-alone Wraparound initiative implemented by a community mental health center or other social service agency with less system-level control.

Conversely, Bickman et al. (2003) found Wraparound to be more 73% expensive, but no more effective than usual care. Youth enrolled in the Department of Defense's Wraparound Demonstration

project evaluated by Bickman et al. utilized significantly more "nontraditional" community-based services, the access to which was a key goal of the project. However, despite the fact that the share of Wraparound youth's total expenditures on congregate care was 51% lower than youth in "treatment as usual," the cost of the additional services was not fully offset. As highlighted above, however, Bickman et al.'s (2003) study had several methodological limitations, and there was no evidence that Wraparound was being implemented to fidelity or that services were significantly different between groups. While Grimes et al. (2011) did not formally measure fidelity to the Wraparound model, they did describe a project much more in line with current Wraparound implementation best practices, including adhering to the Wraparound core principles, focusing on collaboratively set and monitored outcomes, and providing fiscal oversight and system supports as provided by CMEs (Pires & Simons, 2011).

The remaining nine cost-related empirical publications were non-experimental and typically described the reduction in overall service costs over time in a single system of care or Wraparound Initiative. Four of these publications described Wraparound Milwaukee (Grundle, 2002; Kamradt, Gilbertson, & Jefferson, 2008; Kamradt & Meyers, 1999; Kamradt & Prevention, 2000). These articles and book chapters typically demonstrated their program's cost savings by comparing the community's expenditures on out-of-home placements and/or juvenile justice services before and after Wraparound implementation, or by comparing the cost of providing Wraparound to a youth versus average costs of residential treatment. Authors of these studies overwhelmingly concluded that adoption of Wraparound reduced costs and improved efficiencies for the state, county, or community (e.g., Brown & Hill, 1996; Bruns, Burchard, & Yoe, 1995; Grundle, 2002)

Wraparound fidelity. About one-fifth (*n* = 17) of the empirical publications were specifically focused on describing the model adherence within a Wraparound initiative, or exploring drivers of fidelity or how adherence effects client outcomes, with most (*n* = 15; 83.3%) being published in the past

decade. Four merely described the fidelity achieved by a specific program (M. H. Epstein et al., 2005; M. H. Epstein et al., 2003; Kernan, 2014; Kumar, 2007); one explored the theoretical and paradigmatic underpinnings of Wraparound fidelity via multiple case studies (Malysiak, 1998), and one compared fidelity for Wraparound as administered in community-based versus school-based meetings, finding that there were many similarities, but that the school-based program achieved better interagency collaboration (Nordness, 2005).

Three studies explored how the presence of more robust system and organizational implementation support conditions impact adherence to Wraparound principles or practice, all finding that increased supports facilitate higher-fidelity practice. Bruns, Suter, Leverentz-Brady (2006) found that system and program conditions, such as interagency community collaborative teams, an orientation toward accountability and outcomes, and access to flexible and blended funds, was associated with better Wraparound adherence at the team level. Snyder, Lawrence, and Dodge (2012) found that fidelity was rated higher in communities with support provided by a formal System of Care, which often feature many of the same conditions Bruns et al. (2006) found to be positively related to fidelity. Furthermore, Effland, Walton, and McIntyre (2011) similarly found that as systems work to actively build supports for Wraparound care coordination (such as interagency collaboration and accountability, expanded service array, and family involvement), fidelity at the site-level increases.

Two studies also explored how the size and composition of Wraparound teams impacts fidelity; findings suggest that fidelity is best achieved by teams of between four and eight members with consistent meeting attendance and a variety of perspectives represented, especially from the youth's extended family (Munsell, Cook, Kilmer, Vishnevsky, & Strompolis, 2011; Wright, Russell, Anderson, Kooreman, & Wright, 2006). Walker and colleagues have published two papers on various fidelity-related topics. One found that teams with higher quality planning processes (as measured by a study-

specific team meeting observation form) produced more individualized plans and had higher satisfaction among team members (Walker & Schutte, 2005). The other found that older youth's participation in the Wraparound process can be achieved while also maintaining caregiver satisfaction if high-quality engagement and team processes are utilized (Walker, Pullmann, Moser, & Bruns, 2012).

Five studies aimed to test the assumption that higher fidelity to the Wraparound model leads to improved client satisfaction and outcomes. In general, there is some initial evidence to support this hypothesis, though the findings are far from conclusive. Using convenience samples, Bruns at al. (2005) found that total Wraparound Fidelity Index (WFI) scores were higher among families who improve more on standardized measures, and Pagkos (2011) found that higher ratings on the WFI were associated with family's objectives being met at discharge. Effland et al. (2011) further explored which Wraparound practice elements or principles are associated with more positive outcomes, and found that among the 10 principles assessed by the WFI, two were significantly associated with outcomes: community-based (i.e., engaging the youth in community activities and with positive peers and mobilizing community supports for the family) and outcomes-based (i.e., setting clear goals and measuring and acting on evidence regarding progress). The remaining two studies either didn't have a large enough sample size (Rose, 2013) or didn't have enough variability (Ogles et al., 2006) to draw conclusions about the fidelity and outcomes link.

Implementing Wraparound. Thirty-five empirical articles (28.5%) found during this review touched on at least some aspects of Wraparound implementation. The majority (*n* = 18; 51.4%) provided details about implementing a particular Wraparound initiative, while others described ideal system and program structures (*n* = 6; 17.1%), options for use of data and accountability routines (*n* = 5; 14.3%), approaches to workforce development (*n* = 4; 11.4%), and the prevalence of Wraparound implementation nationally (*n* = 2; 5.7%). None were experimental or quasi-experimental, and therefore

did not test a hypothesis or explore the impact of different implementation environments or approaches, though they did all offer some guidance about implementing Wraparound at a programmatic or system-level.

The two studies about prevalence included Bruns, Sather, Pullmann, and Stambaugh's (2011) 2008 national survey of state children's mental health directors in which 88% of states reported having some type of Wraparound program, serving an estimated 100,000 children and families. While a similar number of states were found to have at least one Wraparound initiative in a 1998 survey, in 2008 states also reported increased application of Wraparound standards, increased interagency collaboration, and more formal accountability activities. A dissertation by (Sheppard, 2009) reported that about 25% of Ohio counties were implementing several core components of Wraparound, such as assessing the family, as well as the youth, and having regular team meetings to develop and monitor an individualized plan of care, in an effort to decrease juvenile delinquency.

In the literature examining ideal system and program structures for Wraparound implementation, two of the publications have already been referenced in the fidelity section, as they explored how larger system and program implementation conditions impact adherence to Wraparound principles or practice (E. J. Bruns et al., 2006; Effland et al., 2011); both highlighted the essential role interagency collaboration, accountability structures, and flexible funding play in supporting high-quality Wraparound practice. Similarly, two additional articles by Walker and colleagues (Walker & Koroloff, 2007; Walker & Sanders, 2011) further explicated system supports assessed to be necessary for high-quality Wraparound implementation based on assessments of multiple Wraparound Initiatives and review by a large group of national experts. The six factors found to be critical to developing a system supportive of Wraparound practice include: Community Partnership, Collaborative Action, Fiscal Policies and Sustainability, Access to Needed Supports and Services, Human Resource Development and

Support, and Accountability. This foundational work led the development of the Community Supports for Wraparound Inventory (CSWI) tool that assists Wraparound Initiatives in assessing their level of system development (Walker & Sanders, 2011).

In a relatively unique study, Weiner, Leon, and Stiehl (2011) found that greater geographic proximity to a wide range of community-based services positively moderated Wraparound-enrolled youth's risk of foster care placement disruption, highlighting the need to tailor implementation and service array development based on the population density of the area being served. Mendenhall, Kapp, Rand, Robbins, and Stipp (2013) found that, even within the same state (Kansas), different interpretations of the Wraparound model proliferated, depending on local community conditions and implementation approaches. They concluded that "implementation of Wraparound with fidelity to a central model is difficult on a large scale," attesting to the need for further examination of the causes for and impact of local variation in Wraparound implementation.

Several publications focused more narrowly on using data for quality improvement and workforce development. Five publications described a Wraparound initiative's efforts to integrate implementation and outcomes data into their decision making processes (Bertram, Schaffer, & Charnin, 2014; Bruns, Burchard, Froelich, Yoe, & Tighe, 1998; Bruns, Rast, Peterson, Walker, & Bosworth, 2006; Copp, Bordnick, Traylor, & Thyer, 2007; Kernan, 2014). These papers consistently stressed the importance of routine data collection and feedback in achieving program improvements, and highlighted the benefits of building collaborative accountability supports at various levels of the program and system, and the necessarily iterative nature of the process.

Two empirical publications described the Wraparound workforce, specifically the typical care coordinator (CC). Bowden (2007) specifically examined Wraparound workers' ethical decision making, and found that they are well aware of ethical dilemmas inherent in their practice and they generally feel

confident in their ability to resolve them, especially with the help of training. Bruns, Walrath, and Sheehan (2007) compared characteristics of a large national sample of Wraparound CCs to other children's mental health service providers, and found that Wraparound CCs were less educated, more likely to have only received Wraparound training from agency in-service trainings (as opposed to from specialized trainers), and that those trainings were less likely to provide a manual than trainings for other practices. Despite this, Wraparound providers more often reported that they were fully implementing Wraparound, compared to providers of other treatments protocols. Whether their implementation was actually of higher fidelity is not known, but Bruns et al. called for better Wraparound model specification, development of quality assurance supports, and for higher education to better orient future Wraparound providers to evidence-based practice models and philosophies. Two other publications anecdotally highlighted ways that post-doctoral psychologists in training (John D. Burchard et al., 1990) or well-trained parent employees (Werrbach, Jenson, & Bubar, 2002) could be utilized within a Wraparound initiative to improve access to needed services and client outcomes.

None of the eighteen publications that provided details on the implementation of a specific Wraparound initiative contradicted the conclusions of the broader-focused publications discussed above. They did, however, discuss in finer detail many of the other programmatic aspects of implementation, such as staffing, gaining buy-in, funding, expanding the service array, etc. Many of these descriptions were provided to add context to general evaluation or outcomes data. Wraparound Milwaukee's successful development of a robust system of care and Wraparound initiative was described in three separate publications (Grundle, 2002; Kamradt et al., 2008; Kamradt & Prevention, 2000), and Eber and colleagues described the implementation of several school-based Wraparound initiatives, such as Response to Intervention, La Grange Area Department of Special Education's Wraparound Project, and School-wide Positive Behavior Support (Eber, 1996; Eber & et al., 1997; Eber,

Hyde, & Suter, 2011; Eber, Lindsey, & White, 2010). Taken together, all of the descriptive publications reinforce the need for sustained implementation support activities at multiple levels (workforce development, education and engagement of community partners, development of a comprehensive and effective service array) in order to fully implement high-quality Wraparound. Given the complexity of implementing Wraparound, it's not surprising that several authors emphasized the usefulness of monitoring implementation from the very beginning to identify and correct emerging issues and drive data-based decision making (e.g., Eber et al., 2010; Ornelas, Silverstein, & Tan, 2007; Rotto, McLntyre, & Serkin, 2008).

Use of peer supports. In some initiatives, caregivers and/or youth enrolled in Wraparound are paired with a peer the helps them navigate the process and make sure their voice is heard among the many professionals that can make up a Wraparound team (Penn & Osher, 2007). Despite the increasing use of peer supports in children's mental health systems, the topic has been virtually untouched in the empirical literature (Hoagwood et al., 2010) , especially with respect to Wraparound. Of the three articles found on the topic, none presented any objective data regarding peer partners' impact; although one does present a poignant case study of a successful Wraparound team formed and led by a youth's peers (Gipson, Ortiz-Self, & Cobb-Roberts, 1999). The other two articles serve to further describe the role and integration of peer partners into the Wraparound process. Werrbach, Jenson, and Bubar (2002) provide a case study of a training program for parent employees, and Polinsky, Levine, Pion-Berlin, Torres, and Garibay (2013) describe the year-plus long process of operationalizing the role of parent partners in California and developing and testing a fidelity tool to evaluate their activities.

Discussion

This narrative review of the Wraparound literature set out to answer three main questions. First, what characterizes the Wraparound research over the past 25 years, including the aims, foci, and predominant methods and measures? Second, what evidence is emerging? And third, what notable gaps exist and should be addressed in future research? Substantial research on Wraparound began appearing in the literature 20 years ago. From 1996-2010, approximately eight to nine Wraparound publications were produced per year, a rate that increased to approximately 15 per year since 2011. Across these two decades of effort, empirical and non-empirical publications have been produced in about equal numbers (see Figure 3).

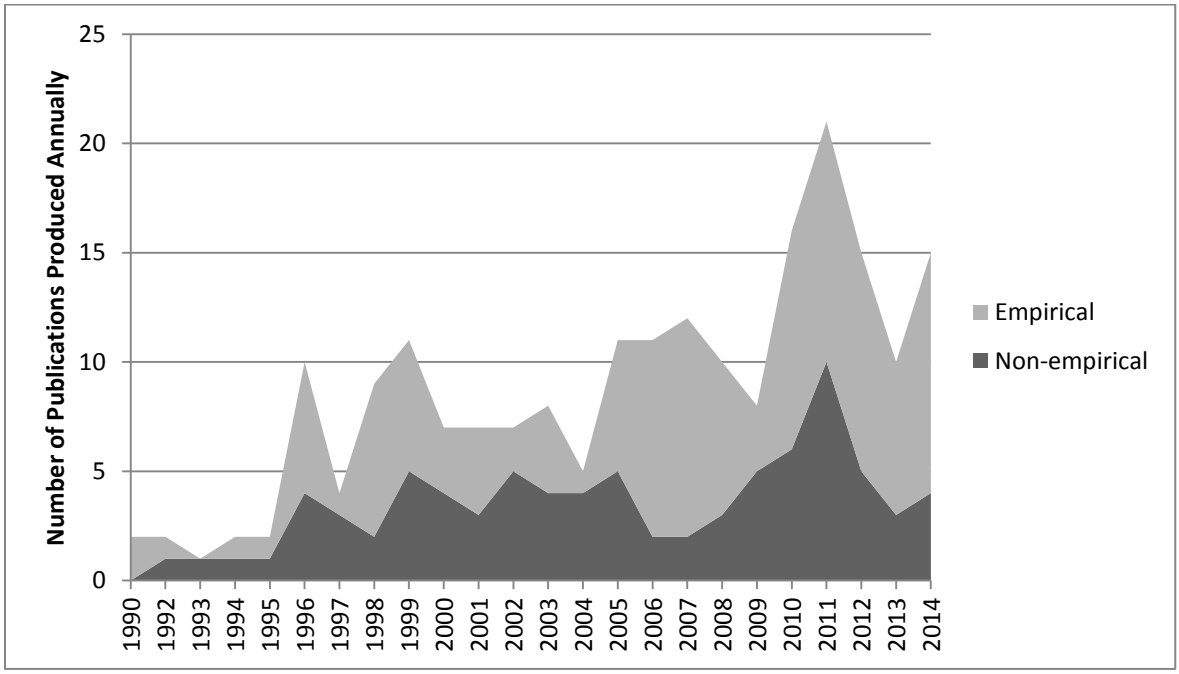

Figure 3. Proportion of empirical versus non-empirical publications about Wraparound published annually

What Does the Evidence Tell Us? Strengths and Gaps in the Wraparound Research Base

Consensus around the Wraparound model. For the past 25 years, a median of 43% (range = 9-100%) of all papers published each year focused on defining the Wraparound process and/or advocating

for its usefulness and implementation. This stream of definitional publications has not slowed, even as the field has clearly coalesced around an increasingly consistent understanding of Wraparound (Bruns et al., 2010; J. D. Burchard, Bruns, & Burchard, 2002; Walker & Bruns, 2006a; Walker, Bruns, & Penn, 2008). While it is understandable that the weight of the published literature was afforded to model definition and utility early in the Wraparound and System of Care movements (as the model was being specified and its potential applications being explained), it is interesting that such literature continues to represent a large proportion of the published research, in the face of the model's specification and widespread adoption.

On the one hand, such continuous production of publications on the nature of model development and implementation might be viewed as encouraging, given that it could represent a systematic process of continual improvement of the Wraparound model based on testing in "real world" contexts, as opposed to what is more typical of EBTs, which commonly involves a series of non-systematic, and undocumented, adaptations (Stirman, Miller, Toder, & Calloway, 2013). Given Wraparound's status as a flexible "operating system" for youth with many types of behavioral health and other needs, development and pilot testing of Wraparound variants could be extremely useful, allowing for change and adaptations to specific contexts on an ongoing basis in the context of small- or even large-scale implementation. Unfortunately, however, with some exceptions (e.g., Bertram et al., 2014) rigorous techniques for doing such adaptation and improvement work have not characterized the model definitional publications we found. Given Wraparound is "open source" and widespread, its continual improvement would be facilitated by more systematic efforts, such as rapid prototyping (Lyon & Koerner, in press) or use of "microtrials" (Howe, Beach, & Brody, 2010).

Evidence for effectiveness. The continued production of non-empirical papers might be less problematic if rigorous empirical papers examining Wraparound effectiveness for its many populations

of focus and system contexts were also being produced. However, non-experimental studies, often pre-post designs, were the most common type of empirical publications found in our reviews. Only 15 quasi-experimental and seven experimental publications aimed at examining outcomes achieved by Wraparound were found. Results of these 22 controlled outcomes studies were far from consistent regarding whether Wraparound was superior to the control or comparison conditions in addressing the needs of youth with SEBD. Four of experimental studies (Aboutanos et al., 2011; Carney & Buttell, 2003; Clark et al., 1996; Ferguson, 2005) found significant between-group differences, with Wraparound youth faring better on functional, school, residential, and child welfare outcomes, even as differences on other outcomes (often ultimate outcomes such as arrests, incarcerations, and foster care placements) within the same studies were null or mixed. Among the quasi-experimental studies, four found Wraparound produced consistent, significantly more positive results for youth in areas such as criminal recidivism, living situation, hospitalizations, and clinical functioning, while six found mixed results, meaning that the Wraparound group did better on some, but not all outcomes of interest.

How does one interpret the "mixed bag" presented by these outcome studies? It is worth noting that 14 of the 22 controlled studies found at least some evidence that favored of Wraparound, and none found better outcomes for the comparison or treatment as usual condition. Only one published study that we know of has found evidence for more positive outcomes for an alternative treatment or services as usual condition. This was the study by Stambaugh et al. (2007) comparing MST to Wraparound in a system of care, which found greater improvement in emotions and behaviors as measured by the CBCL (but not functioning as measured by the CAFAS) in favor of MST. However, these groups were not equivalent at baseline, with the MST condition only including youth who were eligible for that specific intervention, while all other youth with SEBD were served by Wraparound. Finally, several of the

controlled studies that found null results (e.g., Bickman et al., 2003; Bruns, Pullmann, et al., 2014) documented that Wraparound was not implemented as intended.

Further jumbling the mixed bag of findings on Wraparound's effectiveness is a lack of fidelity measurement or even clarity on the model actually used within the outcome studies reviewed. Only 17.8% (*n* = 8) of the total 45 empirical publications aimed at determining the impact of Wraparound on enrolled youth made any attempt at measuring fidelity of the services delivered. This means that more than 80% (*n* = 37) of the empirical studies claiming to add to the knowledge base about whether or not Wraparound is effective, including four of the six experimental publications, did not systematically document the nature of the "treatment" provided, making it difficult to establish a true link between the Wraparound model and outcomes, as well as synthesize and interpret the body of evidence.

Unlike the research base for most EBTs, the vast majority of controlled Wraparound studies are effectiveness (not efficacy) studies, implemented in real-world systems under typically challenging conditions with highly representative youth with very complex needs. Given that there is a large research base showing that EBTs found to be effective under ideal conditions typically are not effective when implemented in the "real world" (Barrington, Prior, Richardson, & Allen, 2005; J. R. Weisz, 2014), the level of evidence in favor of Wraparound in these studies is fairly impressive, despite their limitations. That said, the majority of true Wraparound experiments either predated the model specification efforts of the last 10 years or were found to be hampered by poor adherence. Controlled research under "real world" conditions where Wraparound is supported by clearly described training, coaching, and other implementation supports continues to be needed if the Wraparound evidence base is to be fully convincing.

Evidence for cost effectiveness. Wraparound is often implemented in systems as a way of achieving the "triple aim" of health care: better outcomes and client satisfaction—at lower costs. Grimes

et al. (2011) found that Wraparound had substantially lower claims expenses (e.g. 32% lower for emergency room, 74% lower for inpatient psychiatry) than matched counterparts in a "usual care" group. Although this is the only controlled study of Wraparound in the peer-reviewed literature explicitly focused on costs, its results documenting substantial returns on investment are quite similar to many other studies in the "gray literature" known to the authors, but not included in this review due to their lack of peer review. These publications are primarily evaluation reports aimed at policy makers to shape funding decisions. For example, the Maine Department of Health and Human Services found a 28% reduction in overall average per child expenditures, driven by a 43% reduction in inpatient and 29% in residential treatment expenses (Yoe, Ryan, & Bruns, 2011). The Los Angeles County Department of Social Services found that 12-month placement costs were $10,800 for Wraparound-discharged youth compared to $27,400 for matched group of youth discharged from residential settings (Rauso, Ly, Lee, & Jarosz, 2009). Milwaukee County found that it was able to reduce psychiatric hospitalization from 5000 to less than 200 days and average daily residential treatment facility population from 375 to 50 annually for youth with SEBD (Kamradt et al., 2008).

While these were matched comparison studies or open trials and not experimental studies, they are representative of a range of reports that have documented desired changes in expenditure patterns for systems that have been highly influential in the field. That said, it is clear that inclusion of formal cost components in future controlled studies would be highly important for the Wraparound literature, to lend additional support to the evidence found in book chapters and the gray literature.

Measuring fidelity and isolating Wraparound's mechanisms of change. Wraparound practice is consistently defined as being characterized by 10 principles (Bruns et al., 2010) and a set of core practices (Walker & Bruns, 2006b; Walker & Matarese, 2011). However, there have to date been more studies of the reliability and validity of fidelity measures (e.g., Bruns, Burchard, Suter, Leverentz-Brady,

& Force, 2004; Bruns, Sather, Hensley, & Pullmann, 2013; Bruns, Weathers, et al., 2014; M. H. Epstein et al., 1998) than studies that use these or other measures to rigorously evaluate which of the proposed Wraparound principles, practice elements, or mechanisms of change are most important to achieving outcomes. Using convenience samples, Bruns and colleagues have found that total WFI scores are generally higher among families who improve more on standardized measures (Bruns et al., 2005) and in programs or systems that achieve more positive outcomes on average (Bruns, Suter, et al., 2008), lending some weak support to the link between overall model adherence and outcomes.

A handful of studies have examined which Wraparound practice elements or principles are associated with more positive outcomes. Effland et al. (2011) found that among the 10 principles assessed by the WFI, two were significantly associated with outcomes: community-based (i.e., engaging the youth in community activities and with positive peers and mobilizing community supports for the family) and outcomes-based (i.e., setting clear goals and measuring and acting on evidence regarding progress). Similarly, Cox et al. (2010) found that level of community involvement, number of collateral helpers, and effectiveness of Wraparound teamwork were associated with greater improvement in functioning and attainment of goals. These studies underscore the potential importance of Wraparound being oriented toward community integration, mobilizing natural supports, and being outcomes-based.

To inform ongoing development and implementation of Wraparound and other community-based models, however, additional more rigorous research on the Wraparound practice model and its mechanisms of change is badly needed. As discussed above, this might be better achieved via purposeful examination of individual practice elements, techniques, or enhancements via prospective microtrialing (Howe et al., 2010), rapid prototyping (Lyon & Koerner, in press), and/or dismantling studies (Roberts & Ilardi, 2003) that test impact on proximal and/or distal outcomes, rather than

correlational studies that use convenience samples drawn from fidelity datasets or secondary data analyses from outcomes studies.

Implementation drivers. Given Wraparound's prominence in children's services and variation in its implementation from community to community, there is also a surprising dearth of published studies examining relative effectiveness of various options for implementation support (e.g., organizational context, organizational readiness, administrative structures, workforce development). A few empirical papers have explored implementation context: Bruns, Leverentz-Brady, and Suter (2006) found empirical support for the importance of organizational and systems supports (e.g., maintaining low caseloads, providing ongoing model training and staff support, and establishing systems level collaboration) to achieve high degrees of model adherence. In a qualitative study using grounded theory methods, Walker and Koroloff (2007) explored the implementation context for Wraparound to identify organizational and system variables that must change to support the model. This foundational work led to several papers (e.g., Walker & Sanders, 2011) on the development of measures of community and system support to Wraparound implementation. Overall, however, for a model that aims to be "locally adaptable" (Bruns, Walker, et al., 2014, p. 259), empirical studies that unpack the implications of different policy, financing, staffing, administrative, and system conditions on quality, fidelity, outcomes, and costs are notably lacking.

Similarly, despite the number of Wraparound practitioners now coordinating care for families, implementation research focused on Wraparound workforce development (e.g., supervision or coaching, staff selection staff training, purveyor selection) is also scarce. Walker and Matarese (2011) presented a model for workforce development that is now operational via methods of the National Wraparound Implementation Center (NWIC; see www.nwic.org), and other works have referenced the importance of data-informed methods for coaching or supervision (Castillo & Padilla, 2007; Rosalyn

Malysiak-Bertram, 2001; R. Malysiak-Bertram, Bertram-Malysiak, & Duchnowski, 1999; Walker & Koroloff, 2007). In terms of empirical studies, Bruns, Rast, et al. (2006) found a relationship between the provision of skill-based coaching and increases in measured implementation fidelity over time, and results of at least one outcome study suggest that the lack of attention to workforce development and other implementation issues can compromise outcomes (Bruns, Pullmann, et al., 2014). In general, however, we agree with Bertram et al.'s (2011) assessment that the published Wraparound literature has largely "overlooked or incompletely addressed intervention and implementation components" (p.723).

Noticeable gaps in the research base. Several particularly salient topics were also conspicuously missing from the literature. Only three (1.5%) publications explicitly explored the role and impact of peer support partners, despite the fact that the use of these individuals is highly recommended by model experts as a way to provide additional support and ensure that the Wraparound principle of Family Voice and Choice is embodied in practice (Osher & Penn, 2010; Penn & Osher, 2007). Another area seemingly ripe for exploration, but largely unattended to in the literature, is the breadth, comprehensiveness, quality, and impact of the individual services included in Wraparound plans. While about a seventh of the publications did in some way touch on youth and family's usage of services, very few explored whether youth and/or caregivers felt that care was better coordinated, more meaningful, or easier to access. Similarly, although several publications describe potential options for how better to coordinate evidence-based clinical services with Wraparound (e.g., Bruns, Walker, et al., 2013), the quality of or evidence base for the services received by Wraparound-enrolled youth has not been a focus of the literature, despite these factors' likely impact on outcomes. Lastly, who ends up in Wraparound and who most benefits from it has not been systematically studied, perhaps due to the model's intentional flexibility and origins as an alternative to costly and restrictive out of home

placements for all youth with SEBD regardless of specific presenting problems (Bertram et al., 2011). That said, it is clear that outcomes studies of Wraparound are as likely—if not more likely—to have been conducted (and positive outcomes found) for youth involved in child welfare and juvenile justice systems as behavioral health systems, despite the fact that behavioral health is the most common system to take the lead in Wraparound initiatives (Bruns et al., 2011).

Limitations

The human error intrinsic within the type of large-scale coding project undertaken by the authors is this review's main methodological limitation (Miles & Huberman, 1994). While the authors achieved a very high level of inter-rater reliability, it is still possible that the more subjective codes, primarily the topical foci, were occasionally applied inconsistently. Furthermore, given the volume of data and available resources, a close and detailed reading of each publication was not possible. The coders took pains to closely review the abstracts, methods, and conclusions to ensure the most accurate categorizations possible, but it is still possible that pertinent information was missed.

Limiting the initial search to only publications available online and indexed by the five chosen databases is another limitation. The authors do know of several publications (e.g., cost studies cited in the "gray literature" discussions above, such as Rauso et al., 2009; Yoe et al., 2011) that were not included because they were published in journals not available online or searchable by the databases. Although their absence from these widely-used and comprehensive search engines may speak to the publications' lower impact and reach, these publications have been cited widely due to the potential importance of their findings to decision-makers and may be equally if not more important than many that met inclusion criteria.

Finally, and most obviously, the current synopsis of the Wraparound literature and what it can tell us is limited by the literature itself. As discussed, it is difficult to interpret the strength of evidence in

favor of Wraparound when fidelity measurement is so infrequently included in measurement plans, and formal assessment of mean effect sizes across outcomes is challenged by the variation in outcomes measures employed across studies. Similarly, evaluating critical issues such as Wraparound's applicability to certain youth or family problem areas is nearly impossible because diagnoses and problem areas were not presented in the vast majority of studies, let alone used as a basis for presenting results. Other topics of practical interest, such as the influence of worker background on implementation and outcomes, relevance of Wraparound across different cultures, the role of certain proposed mechanisms of change (such as engagement, high-quality teamwork, or inclusion of natural supports), and variation in implementation or outcomes by types of workforce development methods cannot be commented on here due to their lack of focus in extant research.

Conclusion

In summary, this review found a robust and consistently growing literature base that has made great strides in developing consensus around what Wraparound is (and how to measure it), but less consistent progress in providing conclusive evidence in support of its effectiveness, cost-effectiveness, theory of change, and methods for implementation support. While the current review did not set out to conduct a meta-analysis of effectiveness studies, it is clear from the analysis of the methods and measures of the included publications that many studies lack the hallmarks of rigorous evaluation that could allow for strong conclusions to be drawn in these areas.

The methodological weaknesses of the empirical publications, coupled with the continued high rate of publication of non-empirical thought pieces, suggest that, despite its growing research base and increasingly widespread acceptance, deliberation on the nature of Wraparound is as much in the foreground now as it was decades ago. For some, this could be viewed as a strength, a reflection of Wraparound's capacity to evolve over time and be applied in multiple contexts and settings. Unlike most

EBTs, Wraparound is non-proprietary, locally adaptable (within certain constraints), and aimed at being as much of an "operating system" capable of coordinating care for all youth with SEBD as a focal intervention for a specific problem area. As such, it may be appropriate to promote Wraparound based on such system-level strengths, along with its face validity, appeal to families, and current "weight of evidence." It may also be understandable that we accept the ongoing dialogue over how we can best provide care to this complex and costly population, in the hope that it may promote thoughtfulness in decision making and inspire new ideas and solutions.

On the other hand, many would argue that there are other options for supporting this population of youth and families—such as more traditional, less intensive community-based case management, development of an array of manualized EBTs, and/or continued reliance on treatment in congregate care settings—and that Wraparound has achieved a prominence that outstrips its research base. Taking this perspective, it is incumbent on those working in the Wraparound and children's services field to continue to build an empirical rationale regarding who should receive Wraparound, which version should be provided to maximize outcomes against costs, and what kind of implementation supports should be deployed. Most important, we need to continue to build a research base capable of guiding our understanding of the benefits that can be expected, for both systems that invest in Wraparound and the youth and families who receive it. At a rate of over 15 publications per year since 2010, results of this review suggest that the challenge of generating evidence has been accepted by the field. The next challenge is to focus on producing the evidence that is most critically needed, and doing so with rigor.

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