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Social Convoys of Foster Children after Entering Residential Treatment

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Social Convoys of Foster Children after Entering Residential Treatment

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by

Linda Jang Lee

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ABSTRACT OF THE DISSERTATION

Social Convoys of Foster Children after Entering Residential Treatment

by

Linda Jang Lee

Doctor of Philosophy in Social Welfare

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When foster children's behavioral problems become unmanageable in community settings, residential treatment centers provide a placement option. Upon entering residential treatment, foster children's social relationships may change more or less drastically. The nature of their social relationships and how they change remain unclear; yet, social relationships likely influence children's behavior both positively and negatively. Using Kahn and Antonucci's (1980) convoy model of social relations as a theoretical and methodological framework, this study examined changes in the structure and function of foster children's social relationships ("social convoys") during their first 3 months in residential treatment and how those relate to behavioral problems.

This study used a prospective longitudinal survey method to assess social convoys and behavioral problems of 9 to 13 year-old foster children in two residential treatment centers. The researcher administered Children's Convoy Mapping Procedure to children and Youth Outcome

Questionnaire 30 to child care workers within one month of intake and 3 months later. Data analysis techniques included social network methods, multilevel models, and cluster analysis.

Foster children in this study included a variety of close and important individuals in their social convoys. At baseline, four distinct types of social convoys emerged: balanced-supportive, family-focused more support functions, family-focused fewer support functions, and peer-focused. Over the three months of treatment, children reconstructed their social convoys by adding, keeping, and removing individuals who could or could not provide social support, especially long-term tangible aid of providing care in crisis. Participants with family-focused fewer support functions social convoys, tight-knit networks of family members that provided relatively less support, had the best behavioral outcome.

The results suggest that social convoys of foster children change in many different ways during residential treatment. The environmental attributes of residential treatment, both at the time of transition (e.g. multiple caregivers) and during treatment (e.g. resident turnover), may influence the way children reconstruct their social convoys. This study demonstrated how the convoy mapping method can track short-term changes in foster children's social relationships and has promise for allowing practitioners to regularly assess children's social convoys. Such assessments may provide points of intervention based on the children's perspectives.

The dissertation of Linda Jang Lee is approved.

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2014

Dedication

I dedicate this work to my husband, Josh, and our daughter, Haven. Your endless love, support, and sacrifice made this possible. I love you and thank you for who you are, and for always giving me a reason to take a break – and to get back to work.

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Chapter 1: Introduction

Foster children are minors who are temporarily in care of someone other than their parents by juvenile dependency court order. State and county government agencies that oversee child welfare services arrange such out-of-home care when there are serious child safety concerns in the home, such as child abuse and neglect.[1] Out-of-home care arrangements (a.k.a. "placements") include individual foster homes (living with non-kin adult caregivers who are certified by the government as "foster parents"), kinship care (living with extended family), and group care (living with several other children in facilities operated by private or public organizations). Group care facilities vary in size, from small group homes with less than 10 children to large institutions called residential treatment centers.

When a foster child exhibits serious emotional and behavioral problems, the child welfare caseworker makes a referral to place the child in a residential treatment center. This is because residential treatment centers offer structure and services that are not readily available in other types of placements to address the children's needs (Freundlich & Avery, 2005). While residential treatment centers provide 24-hour group care and behavioral health services for all children with emotional and behavioral problems, the majority of residents are foster children (Drais-Parrillo, 2005; Libby, Coen, Price, Silverman, & Orton, 2005; Sternberg et al., 2013).

Among a range of behavioral health services available for children, residential treatment centers utilize a highly restrictive environment second only to inpatient psychiatric hospitals. Such highly restrictive environments feature limited (some prohibited) choice of activities, monitored interactions with other people, and limited movement within and outside of the environment (Rauktis et al., 2009). However, policy requires treatment in the "least restrictive

[1] "Any recent act or failure to act on the part of a parent or caretaker, which results in death, serious physical or emotional harm, sexual abuse, or exploitation, or an act or failure to act which presents an imminent risk of serious harm." Child Abuse Prevention and Treatment Act (CAPTA), 42 U.S.C.A. § 5106g (2010).

environment" for children. Consequently, child welfare professionals often consider residential treatment centers as a short-term intermediary placement when less restrictive placements such as individual foster homes have failed (Coen, Libby, Price, & Silverman, 2003). In addition, one of the most frequently stated goals of treatment is to return the foster child to a less restrictive placement (Rauktis et al., 2009).

Many foster children who end up in residential treatment centers have multiple prior out-of-home placements, histories of psychiatric hospitalization, and histories of physical and sexual abuse (Drais-Parrillo, 2005). Studies report that over half of the children in residential treatment centers fall within the clinical range for behavioral problems including aggression (e.g. destroying others' things, attacking, threatening) and delinquency (e.g. setting fires, running away, vandalizing) while only 2 percent of the general population does (Baker, Archer, & Curtis, 2005). The percentage of children in residential treatment centers who exhibit clinical levels of behavioral problems is at least 10 percent higher than children in individual foster homes (Baker, Kurland, Curtis, Alexander, & Papa-Lentini, 2007).

While residential treatment results in improved behaviors for some children, the majority of children with clinical levels of behavioral problems remain the same (Cuthbert et al., 2011). For example, research involving multiple residential treatment centers in 13 states revealed that, among the children who showed clinical levels of behavioral problems at intake, less than 40 percent moved out of the clinical range at discharge (Drais-Parrillo, 2005). Yet, behavioral improvement is essential in achieving the treatment goal of returning to less restrictive homes.

Parental involvement during residential treatment has a positive impact on children's behavioral outcomes, such as better impulse control (e.g. delaying gratification, using problem-solving skills to cope with stress) and reduced symptoms of psychopathology (Frensch &

Cameron, 2002; Hair, 2005; Wells, Wyatt, & Hobfoll, 1991). However, for many children in residential treatment centers, parents are absent due to a variety of reasons, including custody issues involving child maltreatment, incarceration, substance abuse, and lost contacts. The social relations literature suggests that various types of relationships, including extended family, friends, and non-kin adults, may be associated with decreased behavioral problems among at-risk children (Popliger, Toste, & Heath, 2009). Yet, it remains unclear if and how foster children in residential treatment centers can benefit from those broader social relationships.

Kahn and Antonucci (1980) viewed social relationships as dynamically developing over time (structure) and as being protective (function). Their convoy model of social relations conceptualizes social convoys as three hierarchical levels of relationships, in terms of closeness and importance to the individual, that influence well-being through provision of social support. Social support refers to one's perception of available help as well as actual help from others, including affective support (expressing love and respect), affirmation support (validating others' actions or beliefs), and tangible aid (providing materials, money, time, etc.) (Demaray & Malecki, 2002; Kahn & Antonucci, 1980; Norbeck, Lindsey, & Carrieri, 1981).

Social convoys benefit children's social adjustment, especially when they include diverse types of relationships such as parents, siblings, extended family, and friends (Levitt, 2005). Different people can fill the child's needs when a source of support becomes unavailable and provide assistance when conflict arises (Levitt et al., 2005; Perry, 2006). In addition, high levels of social support provided by members of the social convoy lead to fewer child behavioral problems (Amlund-Hagen & Myers, 2003; Appleyard, Egeland, & Sroufe, 2007) as well as mitigate the harmful effects of stress (Carothers, Borkowski, & Whitman, 2006). Thus, in residential treatment centers, where the most troubled foster children often reside, social convoys

may play an especially protective role. Such a protective function is particularly important for youths transitioning from middle childhood to adolescence (between 9 years old and 13 years old), because of distinct social developmental changes and an increased risk for behavioral problems such as aggression and delinquency during this period (Wu-Shortt, Stoolmiller, Smith-Shine, Eddy, & Sheeber, 2010).

At a more fundamental level, a gap exists in knowledge about what foster children's social relationships look like and how those social relationships change during residential treatment. Social relationships may change quite significantly during residential treatment because of the nature of the place, including a new social environment for the child, varying lengths of other children's treatment, and regulated contact with previous social relationships. In addition, some social relationships may have negative rather than positive influence due to conflict, stress transmission, and unwanted social support (S. Cohen, 2004).

This study aimed to understand the patterns of 9 to13-year-old foster children's social convoys during the first few months of residential treatment. Four research questions led this study: (a) how do structural and functional properties of foster children's social convoys change during the first three months of residential treatment?; (b) how do relationships between social convoy members and foster children change during the first three months of residential treatment?; (c) are there distinct types of social convoys among foster children in residential treatment centers?; (d) how do foster children's social convoys relate to their behavioral problems during the first three months of residential treatment?

Chapter 2 presents a review of the literature regarding the use of residential treatment centers, the significance of behavioral problems of foster children receiving residential treatment, the link between social relationships and youth behavior, and the social relationships of foster

children. It also reviews methodologies used for assessing children's social relationships that informed the current study. Chapter 3 is a review of the theoretical framework of the convoy model of social relations that guided this study. Chapter 4 describes the research design, measurement, and data analysis methods. Chapters 5, 6, 7, and 8 report the results of the analyses performed to address each of the four research questions. Finally, Chapter 9 discusses the implications of the major findings for theory and practice.

Chapter 2: Literature Review

Residential Treatment Centers

Residential treatment centers provide highly structured, intensive services for children with behavioral health needs that individual homes or outpatient services cannot adequately address. Key characteristics that define residential treatment centers are (a) “a therapeutic milieu” that offers consistent caregiving, a structured environment, therapeutic interventions, and connection to the community; (b) “a multidisciplinary care team” consisting of psychiatrists, social workers, nurses, and other professionals; (c) “deliberate client supervision”; (d) “intense staff supervision and training”; and (e) “consistent clinical / administrative oversight” (Butler & McPherson, 2007, p. 469).

Residential treatment components include individual therapy, family therapy, group therapy, and medication management among others. Research involving 40 residential treatment centers in a Western state indicates that other than formal school hours, which takes up about 45 percent of waking hours not used for meals and personal hygiene, children spend the most time in intensive one-on-one supervision with staff (18%), followed by self-planned activities (10%), recreation (9%), and group therapy (9%) (Libby et al., 2005). Time spent on individual therapy, family therapy, expressive therapy (e.g. art therapy), and psychological assessment is one to two hours per week each. Other services that vary by agency include case management, psychiatric evaluations, and other types of therapies (Libby et al., 2005).

Government entities that oversee child welfare services are the most common referral sources for residential treatment centers (Drais-Parrillo, 2005; Libby et al., 2005; Sternberg et al., 2013). In California, individual counties implement programs and services for foster children, while the state Department of Social Services monitors them (State of California, 2007). This

means that county child welfare departments are the main public agencies that directly work with children and families involved in out-of-home care. Caseworkers in those departments are primarily responsible for finding appropriate placements for foster children. Residential treatment centers are one option, especially when a child has severe behavioral problems and when other placements and community-based services have failed (Coen et al., 2003).

Child welfare policies and research have influenced the view on residential treatment centers by child welfare professionals including county caseworkers. The Adoption Assistance and Child Welfare Act of 1980 required that caseworkers place foster children in the least restrictive environment (i.e. the most family-like setting) as much as possible, pushing residential treatment centers to the bottom of the list. The Adoption and Safe Families Act of 1997 emphasized timely planning and execution of legal permanency (i.e. returning to original family or adoption) as a critical child welfare goal. As this policy deemed long-term foster care as undesirable, residential treatment centers became transitional placements from which children must move out as quickly as possible (Nickerson, Brooks, Colby, Rickert, & Salamone, 2006; Stott & Gustavsson, 2010). In 1999, the Surgeon General's report stated that only 8 percent of children receiving behavioral health services were in residential treatment centers but they used 25 percent of the national budget for child behavioral health (U.S. Department of Health and Human Services, 1999). This highlighted the high cost of residential treatment centers. Moreover, research in this area often lacked rigorous methodology, which brought skepticism about the effectiveness of residential treatment (Butler & McPherson, 2007). The combination of all these factors resulted in reduced government funds for residential treatment (Butler & McPherson, 2007) as well as the perception of residential treatment centers as a placement of "last resort" (Frensch & Cameron, 2002).

Despite this trend, residential treatment centers continue to serve foster children with serious behavioral health needs. Proponents of residential treatment argue that it has a unique place in the continuum of care with its level of structure and comprehensive services, and that the lack of behavioral improvement shown in some research is due to the fact that it is being used too late in the progression of children's behavioral health problems (Bilchik, 2005; Butler & McPherson, 2007). In the year 2011, a total of 240,000 adolescents aged 12 and older used residential treatment for behavioral health needs (Substance Abuse and Mental Health Services Administration, 2013). Studies consistently report that over 60 percent of all children in residential treatment centers are foster children (Drais-Parrillo, 2005; Sternberg et al., 2013). From child welfare standpoint, about 15 percent of foster children reside in group homes and institutions including residential treatment centers (U.S. Department of Health and Human Services, 2013a). However, due to a national effort to avoid placing young children in group homes and institutions, the percentage of foster children under the age of 12 in such settings is lower at 4.5 percent (U.S. Department of Health and Human Services, 2013b).

The most recent data available from the Substance Abuse and Mental Health Services Administration (2013) indicate that in 2008, there were 551 residential treatment centers operating throughout the United States. This is almost one hundred facilities more than the 458 residential treatment centers in 2004 reported by the National Center for Health Statistics (2011). Another nationally distributed survey indicates that over half of the residential treatment centers serve 6 to 12 year-old children, and over 90 percent serve 13 to 18 year-old adolescents, while about 10 percent serve children under the age of 6 (K. Allen, Pires, & Brown, 2010). Non-profit and religious organizations own about 95 percent of residential treatment centers, and the

available number of beds in each residential treatment center ranges from less than 10 to over 100, with an average of 48 beds. (K. Allen et al., 2010).

Information on the average length of stay in residential treatment centers is not readily available. A survey of a convenient sample of 77 residential treatment centers across the country reports an average length of stay of approximately 12 months (Sternberg et al., 2013). Other studies report shorter lengths of stay of 7 to 8 months (Coen et al., 2003; Stage, 1998; Sunseri, 2003). Serious behavioral health needs, such as psychiatric hospitalization during treatment, may contribute to longer length of stay in residential treatment centers (Baker, Wulczyn, & Dale, 2005). However, length of stay in residential treatment centers is generally shorter than other types of out-of-home care, as national data show that the mean length of stay in all types of out-of-home care is almost two years (U.S. Department of Health and Human Services, 2013a).

The state of California classifies group care facilities, which include residential treatment centers, from levels 1 to 14 according to the intensity of care and supervision (measured by the number of hours children receive in service areas of childcare, social work, and behavioral health treatment) as well as staff's education and training levels (California Department of Social Services Foster Care Rates Bureau, 2009). The largest proportion (over 30%) of the group care facilities are level 12 facilities which provide relatively intensive services (Cross, Wakcher, & Carver, 2009). These level 12 facilities serve over 40 percent of all children in group care facilities (Cross et al., 2009; Sunseri, 2001, 2003). Slightly less than 10 percent of all California's foster children between the ages 9 and 13 were in group care facilities in 2013, while the percentage was lower for Los Angeles County (Needell et al., 2014).

Behavioral Problems among Foster Children in Residential Treatment

Foster children in residential treatment centers have experienced multiple stressful events prior to placement, including various forms of child maltreatment, numerous primary caregiver changes, caregiver's behavioral health problems, and violence in the school or in the community (Brady & Caraway, 2002; Briggs et al., 2012). The main reason for placement in a residential treatment center is often the child's behavioral problems, such as injury to self and others and destructive behaviors in the community (Abt Associates Inc., 2008; Coen et al., 2003). Studies report that among children in residential treatment centers, over half and up to 88 percent show clinically significant levels of behavioral problems before and during treatment (Baker, Kurland, et al., 2007; Brady & Caraway, 2002; Burns et al., 2004; Casanueva et al., 2012; Drais-Parrillo, 2005). This proportion is significantly higher than the proportion of children in individual foster homes with clinically significant levels of behavioral problems (less than 50%) (Baker, Kurland, et al., 2007; Casanueva et al., 2012; Rubin et al., 2008).

Current literature often categorizes children's behavioral problems into internalizing and externalizing behaviors. While internalizing behaviors mainly represent disturbance in the emotional state, externalizing behaviors are actions directed toward others (Zahn-Waxler, Klimes-Dougan, & Slattery, 2000). Internalizing behaviors include withdrawn, anxious, and depressive behaviors such as being fearful of going to school, refusing to talk, and talking about suicide (Achenbach & Rescorla, 2001). Externalizing behaviors include aggressive and disruptive behaviors such as destroying other people's belongings, threatening people, and setting fires (Achenbach & Rescorla, 2001).

Eisenberg et al. (2001) compared children with internalizing and externalizing behavioral problems on their emotionality and behavioral regulation. Emotionally, internalizing children

scored higher on measures of sadness whereas externalizing children scored higher on measures of anger and frustration. This suggests that predisposition to negative emotions such as sadness and anger may cause children to either withdraw or to act out. Behaviorally, children with externalizing behavioral problems showed much more impulsivity (e.g. rushing into an activity without thinking about it, interrupting others during conversation) than internalizing children. On the other hand, internalizing children showed even less impulsivity than children without clinically significant behavioral problems. The authors explain that such a high level of behavioral regulation may not be healthy because it shows that the children are very inhibited without the flexibility to adapt to different situations (Eisenberg et al., 2001).

While internalizing and externalizing behaviors have such distinct qualities, many children show both internalizing and externalizing behavioral problems at the same time, as the underlying negative emotions co-occur and are interrelated (Zahn-Waxler et al., 2000). In the study by Eisenberg et al. (2001), 35 percent of the sample children showed both internalizing and externalizing behavioral problems, while 17 percent showed internalizing behavioral problems only and 15 percent showed externalizing behavioral problems only. According to Lilienfeld (2003), one of the most supported reasons for such co-occurrence is that children with internalizing and externalizing behavioral problems share a common tendency to "experience unpleasant affective states of many kinds, such as guilt, anxiety, mistrust, and irritability" (p.288). Internalizing and externalizing behavioral problems may also co-occur because of a sequence of reactions. For example, children who act out (i.e. exhibit externalizing behavior) may experience peer rejection, and in turn, feel sadness and eventually withdraw (i.e. exhibit internalizing behavior) (Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003).

These behavioral problems relate to a range of negative outcomes. For instance, McMillen, Auslander, Elze, White, and Thompson (2003) discovered that, among foster children, internalizing and externalizing behavioral problems are associated with problems in school. The researchers interviewed 262 foster children between the ages 15 and 19 in a suburban area in the Midwest. Of the participants, 54 percent were currently in group homes and residential treatment centers, and over 80 percent had been placed in such group care before. The youths' externalizing behavioral problems correlated with problems in school, operationalized as having skipped classes, fought with other students, and fought with teachers both physically and verbally. Both internalizing and externalizing behavioral problems correlated with having repeated a grade before. Although the researchers only examined bivariate relationships, this shows how behavioral problems may not be contained within the residential treatment center and may affect different areas of life.

In addition, Kosterman and colleagues (2010) found that externalizing behavioral problems in childhood and adolescence predict depression in early adulthood. They used longitudinal data collected from 808 students in urban public schools. The sample overrepresented children from high-crime neighborhoods and about half were from low-income families. Parents reported children's externalizing behavioral problems such as attacking people and destroying property at ages 10, 13, 14, 15, and 16, and children's self-reports on the same behaviors were collected at ages 10, 13, 14, 15, 16, and 18. Parent-reported behavioral problems at age 14 and above predicted depressive episode at age 21, while child-reported behavioral problems at all ages predicted depressive episode at age 21. Behavioral problems in childhood and adolescence increased the odds of having depression in early adulthood by 2 to 4 times. The fact that behavioral problems observed as early as age 10 are associated with later depression

suggests that behavioral problems may carry on and have cumulative effects on children (Kosterman et al., 2010).

Likewise, a major problem is that behavioral problems among foster children in residential treatment centers tend to persist even after treatment. In a longitudinal study, Cameron, Frensch, Preyde, and Quosai (2011) examined the behavioral outcomes of 105 children in 5 residential treatment centers. They examined the clinical records of children at intake and at discharge, and assessed their behavioral problems 12 to 18 months after discharge. At follow-up, the average age of the children was 14 years old. The clinical records at intake and discharge included caregiver reports of children's delinquent and illegal activities such as stealing, destructing property, and using weapons. At follow-up, the researchers obtained the same kinds of information by interviewing the children's parents or guardians on the phone. The results indicated a significant decrease in such delinquent behaviors from intake to follow-up, with a medium-large effect size[2] of .16. However, the level of those behavioral problems was still above the clinical cut-off score set at the 98th percentile of the general population. Moreover, despite some improvement in delinquent behavior, the proportion of youth who had contact with the law (being arrested or legally charged due to physical attacks, property destruction, etc.) increased 14 percent from intake to follow-up. Contact with the law prior to treatment tripled the likelihood of having contact with the law at follow-up.

Similarly, another longitudinal study with 6 to 17 year-old youths found that those with high levels of behavioral problems before residential treatment continued to be within the clinical range two years after discharge (Cuthbert et al., 2011). It appears that while residential treatment can help youths modify certain behaviors, it may not be true for extremely problematic

[2] For paired t-test results, effect size $r^2 = t^2 / (t^2 + df)$ where df is the degree of freedom. The r^2 values of .01, .09, and .25 are defined as small, medium, and large, respectively (J. Cohen, 1992).

behaviors. Both authors also discuss that when youths with severe behavioral problems leave intensive treatment settings and return to the community, they need ongoing supports including social relationships with adults and peers (Cameron et al., 2011; Cuthbert et al., 2011). In fact, a longitudinal study found that youths with strong sense of belonging during foster care continued to have more supportive social relationships after leaving care, and in turn, had better adult outcomes including no depression or suicidal ideation, no criminal behavior, and no substance use problem (Cashmore & Paxman, 2006). While residential treatment is intended to be a one-time intervention, positive social relationships that children develop and maintain within the therapeutic milieu may endure beyond the treatment effects and may be a more robust protective mechanism for long-term outcomes.

Social Relationships and Youth Behavior: The Role of Social Networks

Social network refers to the interrelated social relationships surrounding an individual. The study of social networks involves viewing it both from the perspective of the individual (*egocentric* or *personal* networks) and from a "bird's eye view" of the entire set of networks (*sociometric* or *whole* networks) (Berkman & Glass, 2000). Researchers frequently use the egocentric approach to study the effects of social relationships on individuals' behavior. Others use the sociometric approach when studying a group with a predetermined boundary, such as a residential treatment center. Network properties include how many members there are (*size*) and what proportion of the members are connected to each other (*density*). Thus, social network is a structural property of social relationships.

Another important concept in studying social networks is the *tie*, which refers to the connection between two individuals within a social network. A social network forms its pattern according to the characteristics and functions of the ties. The different tie characteristics and

functions include roles (e.g. family of, friend of, boss of), affective/cognitive state (e.g. likes, hates, knows), interactions (e.g. talked to, helped, asked), flows (e.g. information, beliefs, social support), and similarities (e.g. in same group, with same attitude, in same place) (Borgatti, Mehra, Brass, & Labianca, 2009). This study defines social networks as patterned mainly by roles, the affective state of emotional closeness, and the flow of social support and negative interactions. This section describes roles and emotional closeness as structural properties of social relationships, and the following sections further discuss social support and negative interactions as functional properties of social relationships.

First, some researchers have examined the composition of different roles in children's social networks. For example, Popliger et al. (2009) studied elementary school-aged children's perception of social support from parents, teachers, and friends. They found that social support from friends was significantly associated with emotional and behavioral problems such as internalizing behaviors and interpersonal relationship issues, while social support from teachers was associated with children's academic and behavioral competence (satisfaction with their own behavior). Thus, the composition of roles within social networks (e.g. having more supportive friends than supportive teachers) may affect children's behavioral problems in different ways. The next section on social support discusses this study in more detail since it involves how these roles affect children's behavior through the provision of social support.

Second, the emotional closeness between individuals in a social network indicates *tie strength*, which refers to "the emotional intensity of a relationship" (Marsden & Campbell, 1984, p. 498). Strong ties, i.e. closer relationships, influence behaviors more easily through behavioral modeling and social support (Valente, 2010). Moreover, social networks with strong ties tend to provide high levels of dependable social support because the members are more likely to be

responsive to the individual's needs (Cotterell, 1994). In a study involving foster youths in a Midwestern state, Perry (2006) assessed the tie strengths of the youths' biological family network (biological parents and siblings), foster care network, and peer network, and their influence on the youths' depression and anxiety. Tie strength was measured by the youths' perception of how close, caring, and supportive members of each network are to the youths themselves. Compared to youths who had no strong networks, those with at least two strong networks (e.g. strong biological family network and strong foster care network) had fewer symptoms of depression. Interestingly, the strength of foster care network had a greater effect on depression than did the strength of biological family network (Perry, 2006). This was probably due to the fact that foster youths in the study felt that their foster care providers cared about them more than their biological family did. Important to point out here is that the measure of tie strength in Perry's (2006) study included social support.

As shown above, research on children's social networks and behavioral problems often includes social support as a functional network property and relatively little attention has been given to the independent effects of structural network properties. Nonetheless, Neal's (2007) structural approach to studying relational aggression (e.g. social exclusion) during middle childhood and adolescence is helpful in understanding the role of social networks. According to this approach, structural network properties mediate the relationship between individual-level variables and the level of relational aggression. For example, as children get older (individual-level variable), their social networks show more racial similarity among members (network property called *homophily*), which may increase levels of intimacy within the network (tie strength), thus affecting the level of relational aggression toward peers outside their networks (Neal, 2007).

Social Relationships and Youth Behavior: The Role of Social Support

Social networks influence behaviors by providing social support through the ties (Berkman & Glass, 2000). Social support refers to one's perception of available help as well as actual help from others, including affective support, affirmation support, and tangible aid (Demaray & Malecki, 2002; Norbeck et al., 1981). Affective support includes expressions of love and respect, while affirmation support validates and acknowledges the appropriateness of the other person's actions or beliefs (Kahn & Antonucci, 1980). Tangible aid refers to provision of things, money, information, or time (Kahn & Antonucci, 1980). Others have categorized social support into emotional, instrumental, appraisal, and informational support (Berkman & Glass, 2000). Emotional support encompasses affective support and affirmation support, while instrumental support equals tangible aid. Appraisal support (help in decision making) and informational support (provision of advice and information) are often difficult to distinguish from emotional support (Berkman & Glass, 2000). While various definitions and categories exist, social support essentially pertains to the functional properties of social relationships.

Research on social support and behavioral outcomes among at-risk youth populations includes a study by Popliger et al. (2009) discussed in the previous section. The sample included 54 elementary school-aged children with moderate to severe emotional and behavioral difficulties (EBD), a condition which many children in residential treatment share. School teachers nominated children with EBD to participate in the study, and all of the children were in regular classrooms according to an intervention philosophy to treat EBD in the community setting. The researchers measured how much a child "feels loved, cared for and valued by" each of three relationship roles – family, friends and teachers (p.201). The study showed that perceived social support from these roles was associated with different areas of adjustment.

Perceived social support from all three roles combined significantly correlated with internalizing behavioral problems, interpersonal relationship problems, emotional disturbance, and self-esteem. When all of these outcome variables were combined as a single indicator of emotional/behavioral functioning, social support from friends was a significant predictor, with a medium effect size[3] (0.19).

While social support may have an overall positive effect on well-being, the stress-buffering hypothesis posits that it can moderate the negative influence of stressful events as well (S. Cohen & Wills, 1985; Schwarzer & Knoll, 2007). Such a stress-buffering process is especially relevant to residentially-treated foster children who must cope with a variety of aforementioned stressful life events as well as daily stressors such as having an argument with a friend (Parfenoff & Jose, 1989). The stress-buffering effect is particularly evident in Kaynak, Lepore, and Kliewer's (2011) study involving 216 inner-city youths who witnessed and experienced many types of community violence, including seeing someone attacked with a knife and being chased by gangs. Social support from a parent and another adult moderated the relationship between exposure to community violence and depressive symptoms, which is an internalizing behavioral problem. For youths with low levels of social support, the level of exposure to violence was positively associated with symptoms of depression. However, for youths with high levels of social support, exposure to community violence did not increase depressive symptoms, highlighting the significance of the amount of social support. The effect size of the interaction between social support and exposure to violence was 0.01. While this is a small effect size in conventional terms, research has shown that the mean observed effect size in tests of interaction is 0.009 (Aguinis, Beaty, Boik, & Pierce, 2005).

[3] For multiple regression results, effect size Cohen's $f^2 = R^2 / (1 - R^2)$ where R^2 is the variance in the dependent variable explained by the independent variable. Cohen's f^2 values 0.02, 0.15, and 0.35 are defined as small, medium, and large effect sizes, respectively (J. Cohen, 1988).

Another study that tested the stress-buffering hypothesis is Carothers and colleagues' (2006) longitudinal research involving children born to adolescent mothers. From birth to adolescence, the 96 children in their study experienced many negative life events that are similar to those experienced by children in residential treatment, such as residential instability, family separation, and school problems. When the participating children were 11 to 17 years old, the researchers asked them to retrospectively report their perceptions of past social support, including attachment to parents, the presence of other supportive figures, and involvement in social groups. The results indicated that social support alleviated the adverse effects of stressful events on children's internalizing and externalizing behavioral problems. However, this was true only for children with fewer number of negative life events, suggesting that social support may not be effective for children in extremely stressful circumstances. The effect size of the level of social support was medium-large (0.23) for internalizing behavioral problems and medium-small (0.12) for externalizing behavioral problems. The effect size of the interaction between social support and stressful life events was medium-small for both internalizing and externalizing behavioral problems (0.07 and 0.09, respectively). It seems that social support may have larger direct effect on internalizing behavioral problems than on externalizing behavioral problems, but the buffering effect may be similar for both.

Social Relationships and Youth Behavior: The Role of Interpersonal Stress

Social relationships are not always protective and may become a source of stress. Such negative aspect of social relationships may be due to various reasons including negative interactions and social isolation (S. Cohen, 2004). For instance, Hoefnagels, Meesters, and Simenon (2007) studied the influence of perceived social support on behavioral problems of 40 teenage children born to psychiatric patients. They measured social support in terms of positive

interactions, negative interactions, and the discrepancy between demand and supply of support. Youths in the study reported that they did not receive the type and amount of social support they wanted, but instead experienced negative interactions such as criticism and unfair treatment. Furthermore, their perception of negative interactions, but not positive interactions, strongly correlated with more behavioral problems. This negative aspect of social relationships is important to consider when studying foster children in residential treatment centers because they come from dysfunctional families and have constant contact with other children with social adjustment problems. In other words, foster children in residential treatment centers may experience negative interactions more often than others.

Another example of negative interactions is evident in A. Lee, Hankin, and Mermelstein's (2010) study on youth's depressive symptoms. The sample included 350 youths aged 11 to 17, and the researchers assessed negative interactions such as conflict and criticism with family and friends at three time points, 5 weeks apart. As a part of a mediation analysis, they found that negative interactions with parents predicted youth's later depressive symptoms while controlling for their initial level of depression. On the other hand, only a weak correlation existed between negative interaction with friends and youth's depressive symptoms, again highlighting how different roles may influence different areas of adjustment.

While negative interactions occur when there is in fact a social relationship, the lack of such social relationships may also be a source of stress for youths. Pettit, Green, Grover, Schatte, and Morgan (2011) examined interpersonal and non-interpersonal stress among adolescents who attempted suicide and admitted into a psychiatric hospital. Interpersonal stress in close friendship and social life was operationalized by lack of a confiding relationship, social isolation, and rejection by peers. The researchers found that among 55 adolescents who attempted suicide in

the previous week, those with high levels of interpersonal stress from social isolation were more serious in their intention to die. A notable point is that both Pettit et al. (2011) and A. Lee et al. (2010) defined interpersonal stress as an ongoing, chronic stress. With multiple moves between out-of-home placements, foster children in residential treatment centers may experience high levels of chronic interpersonal stress due to instability in social relationships (Hyde & Kammerer, 2009).

Social Relationships of Foster Children in Residential Treatment

In general, research on various social relationships exists, except in certain settings. Residential treatment research involving social support has focused mostly on parental support. Studies indicate that parental involvement during residential treatment is linked to various child outcomes, including discharge destinations and adjustment in the community post discharge (Frensch & Cameron, 2002; Hair, 2005; Landsman, Groza, Tyler, & Malone, 2001). Specifically, no or minimal visits with parents increase children's likelihood of treatment incompletion due to serious behavioral problems, running away, and incarceration (Sunseri, 2001). In addition, Lakin, Brambila, and Sigda (2004) found that higher rate of family therapy attendance during residential treatment relates to fewer youth behavioral problems at discharge. However, according to a survey of a national cluster random sample of 700 foster children, children in residential treatment centers experience frequent cancellations of family visits and very few contacts with mother every month (U.S. Department of Health and Human Services, 2003). This survey revealed that during the first year of placement, 60 percent of foster children in group care reported frequent cancellations of family visits, compared to 28 percent of children in individual foster homes. Moreover, during the first year of placement, almost three quarters of foster children in group care had fewer than two contacts with mother per month, compared to 69% and

39% of children in individual foster homes and kinship care, respectively (U.S. Department of Health and Human Services, 2003). This finding suggests limitations among foster children in residential treatment centers as to how much they may benefit from parental social support.

Nonetheless, research on non-parental social support for foster children in residential treatment centers is lacking. Research on non-residential populations provides evidence for potential influences of social support from others. First, siblings may provide social support to each other (Milevsky & Levitt, 2005; Tucker, McHale, & Crouter, 2001). For example, children who are in foster homes with their siblings tend to make better adjustments than children who are separated from siblings (Leathers, 2005). Research also indicates that the quality of sibling relationships matters more than whether or not siblings live together in the same foster homes. In a longitudinal study, foster children with close, affectionate, and nurturing relationship with their siblings showed fewer behavioral problems at follow-up regardless of whether or not they lived with their siblings in the same foster homes (Linares, Li, Shrout, Brody, & Pettit, 2007). This is especially relevant to foster children in residential treatment centers, as children placed in group care are more than twice as likely to be separated from their siblings than are children placed in individual foster homes[4] (Wulczyn & Zimmerman, 2005), possibly due to different behavioral health needs of the siblings (Leathers, 2005).

Extended family may also provide social support that aids children's adaptive behavior and overall positive development (Pallock & Lamborn, 2006). Research on kinship care shows that foster children placed with extended family in comparison to those placed in non-kin foster homes exhibit fewer behavioral problems (Keller et al., 2001; Rubin et al., 2008). Moyers, Farmer, and Lipscombe (2006) also found that grandparents provide social support and help

[4] Based on 15 years of administrative records of over 160,000 foster children in New York City's child welfare system

foster youths maintain contact with their family during long-term foster care. These studies suggest the potential benefits of extended family relationships for foster children in residential treatment centers due to their unique position in the children's personal social networks. In contrast, child welfare professionals who work with extended family caregivers frequently report disruptive family dynamics that stem from the child's birth family, which may have negative consequences for foster children (Peters, 2005).

Other adults, including child care staff and non-kin community members, may also be significant support figures for foster children in residential treatment centers. Research on mentoring shows that foster children often identify former placement staff and family friends as adults who listen, share experiences with them, and guide them (Munson, Smalling, Spencer, Scott, & Tracy, 2010). Moreover, long-term relationships with such mentors are associated with lower levels of perceived stress and less likelihood of having been arrested in the past year for youths transitioning from out-of-home care to independence (Munson & McMillen, 2009). Foster care providers (e.g. foster parents, residential treatment staff) may also provide continued support even after youths leave care. Cashmore and Paxman (2006) studied youths who were about to leave foster care due to the legal age limit ("age out of care") and found that over 20 percent of the youths still lived with their foster parents one year after discharge. This continued residence was associated with how much the youths felt loved during care. Likewise, a study involving young adults discharged from residential treatment centers indicates that youths feel the need for continued connections with non-family adults (Freundlich & Avery, 2005).

Finally, peer relationships become increasingly important as children transition to adolescence (Youniss, 1980). This may be especially true for foster children in residential treatment centers as they spend more time with or in the presence of other children than do their

counterparts in the general population. Research indicates that peer social support buffers the negative effects of inadequate family environments. For example, Lansford, Criss, Pettit, Dodge, and Bates (2003) found that peer relationships characterized by helpfulness, emotional security, and sense of belonging moderate the harmful effects of inadequate parenting on youths' externalizing behavior. Conversely, exposure to high-risk peers may exacerbate delinquency via a *contagion effect* that is related positively to the proportion of deviant youths in the peer group (Dodge & Sherrill, 2006). For instance, Robst, Armstrong, and Dollard (2011) found that youths with a high proportion of peers with felony and misdemeanor charges before and during residential treatment were more likely to have contact with the law after treatment. On the other hand, B. R. Lee and Thompson (2009) discovered that while peer contagion was indeed present among youths in a group care facility, it adversely affected less than 10 percent of the youths.

While examining the role of different types of social relationships independently can help make practical suggestions for improving residential treatment, it may not accurately reflect the multidimensional social context. For instance, the group care facility in B. R. Lee and Thompson (2009) employs an established practice model in which the child care staff, who are married couples, live with the youths and act as surrogate parents (Kirigin, 2001). Their relationship with the youths is clearly different from that of child care staff in other residential treatment centers who work in shifts, live off-site, and primarily focus on managing behaviors rather than providing nurturance (Jones, 2008). Such relationships may influence not only the youths' relationship with peers, but also their biological family and other significant individuals. Furthermore, these interrelated social relationships, i.e. the social network, may collectively influence children through interactions that occur both in the presence and in the absence of the child (M. Lewis, 2005). Thus, it is necessary to examine social relationships of foster children in

residential treatment centers in their entirety to better understand their influence on the youths' adjustment.

Changes in Social Relationships during Residential Treatment

In residential treatment centers, three factors may contribute to fluctuations in foster children's social relationships: (a) children's developmental stage; (b) children's behavioral problems; and (c) residential treatment centers as a temporary placement option. First, children's social relationships change both structurally and functionally as they grow. Levitt, Guacci-Franco, and Levitt (1993) examined social relationships of ethnically diverse, lower-middle to middle class, urban public school children. They found that as children grow older, their network size also grows by including more extended family around age 10, while friends replace extended family at age 14. They also found that the function of those relationships follows a similar pattern. Around age 10, extended family members provide additional social support on top of parental support, and around age 14, friends replace extended family to provide social support. Research consistently reports the shift of relationship importance from family to peers in early adolescence, especially in the context of poor attachment to parents (Nickerson & Nagle, 2005).

Other researchers have exclusively looked at children's peer relationships and found that considerable changes occur in relatively short periods of time. For instance, J. P. Allen et al. (2006) asked urban and suburban middle school students to name their closest friend. One year later, close to 70 percent of the participants named a different closest friend. To measure such friendship stability, Ellis and Zarbatany (2007) used a shorter time interval of 3 months and asked 10 to 14 year-olds to name all their friends using the school roster. On average, less than 60 percent of the friends nominated at the initial measurement were nominated again 3 months

later. Ellis and Zarbatany (2007) also found that aggressive behavior (e.g. starting fights, picking on other people) is negatively associated with friendship stability. In J. P. Allen and colleagues' (2006) study, the youths' initial depressive symptoms were associated with withdrawal from friends at follow-up. As foster children in residential treatment centers tend to exhibit high levels of externalizing (aggressive) and internalizing (depressive) behavioral problems, their peer relationships may also show much instability. However, there is no prior research on this topic involving foster children in residential treatment centers.

In addition to age and behavioral factors, the experience of moving into a residential treatment center may lead to changes in social relationships, as a key factor in social relationship changes is major life transitions (Levitt et al., 2005). Werner and Johnson (2004) observed that unrelated children in a foster home may develop supportive social relationships with each other that may contribute to positive outcomes such as satisfaction with career and romantic relationships in adulthood. Likewise, social relationship with caring adults can be a turning point toward better adaptation for foster youths (Drapeau, Saint-Jacques, Lepine, Begin, & Bernard, 2007). On the other hand, Unrau, Seita, and Putney (2008) found both positive and negative aspects of social relationship changes among former foster children who experienced at least three placement changes. As adults, the study participants remembered losing friends and separating with siblings, but also recalled developing new supportive social relationships with non-kin adults including caseworkers and foster parents. In residential treatment centers, not only do children experience changes in social relationships when they move in, but they also experience changes when other children and staff come and go. This phenomenon is largely unknown and it is necessary to examine it before testing whether or not social relationships affect behavioral problems of foster children in residential treatment centers.

Methodologies Used for Assessing Children's Social Relationships

Sampling. Appendix A shows the different methods of empirical studies discussed in the preceding sections that examined children's social relationships. Studies that recruited participants from schools through availability sampling had relatively large samples, ranging from 143 students in one public middle school (J. P. Allen et al., 2006) to 691 students in 8 elementary schools (Levitt et al., 2005). One study used secondary data of 90,000 students from 129 randomly selected schools across the country (Haynie, 2001). Studies that included foster children in their samples recruited participants from state/county child welfare departments or from private foster care agencies, with the exception of one study that used secondary data of a nationally representative sample of over 1,300 foster children (Rubin et al., 2008). The former studies had sample sizes ranging from 154 foster children recruited from 15 counties (Perry, 2006) to 339 foster children from 8 county child welfare departments (Munson & McMillen, 2009). Studies that targeted other at-risk children had smaller availability samples who met specific criteria, including 40 children of psychiatric patients recruited from 3 clinics (Hoefnagels et al., 2007), and 54 children with Emotional and Behavioral Disorders referred by teachers at 6 elementary schools (Popliger et al., 2009). In sum, all but two studies used non-probability sampling methods by recruiting participants through different sites or agency client lists. In a study involving a specific sub-group of foster children, who reside in unique environments that may significantly affect their social relationships, it is both feasible and logical to select the sites first and then recruit participants from those sites.

Research design. In terms of research design, six studies used cross-sectional methods to examine the association between children's social relationships and their behavioral problems. Eight studies used longitudinal design but measured children's social relationships only once.

The researchers used longitudinal design to either measure changes in behavioral problems over time or to set the temporal order required for establishing causal relationship between social relationships and behavioral problems. The researchers conceptualized social relationships as relatively stable and as accumulating social support functions. The time period between baseline and follow-up for studies with one follow-up ranged from 8 months (Kaynak et al., 2011) to 5 years (Leathers, 2005). Three studies had multiple waves of data collection, with the total length of time ranging from 1 year at 6-month intervals (Munson & McMillen, 2009) to 17 years from birth at 2 to 3-year intervals (Carothers et al., 2006).

Four additional studies measured social relationships over time. The shortest duration between baseline and the first follow-up was 5 weeks (total length of study was 10 weeks), and the reason for such short-term follow-up was to ensure more accurate measurement of participants' depressive symptoms (A. Lee et al., 2010). However, the researchers only used social relationship measurement from the first follow-up in their multivariate analysis, and did not report the descriptive statistics from baseline or the second follow-up. Other studies used 3-month, 1-year, and 2-year follow-up intervals. The 3-month follow-up study examined the stability of friendships within school (Ellis & Zarbatany, 2007), and the 2-year follow-up study examined changes in the broader social relationships that included immediate and extended family members among children in the general population (Levitt et al., 2005). Both studies showed considerable changes in the children's social relationship structure over time. As discussed in the previous section, over 40% of children aged 10 to 14 identified different people as their friends over a 3-month period (Ellis & Zarbatany, 2007). Ellis and Zarbatany's (2007) work especially highlighted the fast changing peer social relationships among pre- and early adolescents, as the friendships were measured in the middle of the school year, not when the

classes changed. On the other hand, Levitt and colleagues (2005) examined children's social relationship structure as patterned by the sources of social support (close family, extended family, and peers). Initially, their 9 to 11 year-old participants fit into one of three groups, (a) children who received social support mainly from close family, (b) children who received social support from close family and extended family, and (c) children who received social support from close family and friends. Two years later, about 40% of the children in the "close family" group showed different social relationship structure (belonging to either the close family/extended family group or the close family/friend group), and over half of the children in the other two groups showed changes in the social relationship structure.

This review suggests that among youths transitioning from middle childhood to adolescence, a follow-up interval as short as 3 months may reveal changes in social relationships even in a relatively stable environment such as the school in mid-year. When measuring social relationships of foster children as they first come into residential treatment centers, even shorter intervals may detect changes in social relationships. Moreover, some children in residential treatment centers stay for less than a few months (e.g., mean 7.5 months, range 1 day~30 months; Libby et al., 2005) so longer intervals are not desirable.

Social relationship measures. Researchers operationalized children's social relationships in various ways. Studies involving foster children primarily examined placement patterns (with/without siblings, with/without kin) while one study looked at the duration of foster children's social relationship with one non-kin mentor (Munson & McMillen, 2009). One study (Linares et al., 2007) used a Likert scale to measure the relationship quality between siblings in out-of home care and found that foster children's perception of their relationship with siblings (affectionate, competitive, etc.) stayed similar over a 15-month period. Another study (Perry,

2006) used Likert scales to measure the strength of biological family, foster care, and peer networks by asking foster youths to rate how close they feel to the network members, how much they can rely on the members for help, and how much the members care about them.

Of the studies involving non-foster children, five studies used Likert scales with known validity and reliability. Of those, two studies assessed children's perception of social support (Survey of Children's Social Support, Network of Relationships Inventory – positive interactions subscale), one study assessed negative interactions between children and others (Network of Relationships Inventory – negative interactions subscale), and two studies examined both positive social support and negative interactions (Social Support Inventory, Friendship Qualities Scale). The Network of Relationships Inventory (Furman & Buhrmester, 2009) is a 24-item questionnaire that measures two areas of social relationships – social support and negative interactions – on a 5-point scale. Each item asks about a specific person (e.g. How much do you seek out this person when you're upset?) and the researcher can choose those individuals. For instance, Lee and colleagues (2010) asked their participants to answer the questions for each family member (mother, father, and sibling) as well as one same-sex friend, one opposite-sex friend, and one boy/girlfriend. Researchers have used the social support and negative interactions subscales separately as they represent distinct qualities of the social relationship (Kaynak et al., 2011; A. Lee et al., 2010). On the other hand, the Survey of Children's Social Support measures only emotional support, and the Friendship Qualities Scale only measures relationship functions provided by friends. The Social Support Inventory measures both social support and negative interactions, but it is only available in Dutch. So far no researcher has translated and used this scale to measure social relationships of English-speaking individuals. Therefore, whether or not this scale is culturally appropriate for youths in the United States is unknown.

Other measurement methods included the following. Two studies assessed children's social relationship structure (social networks) by having the children nominate friends from the school roster. One study measured social support by a list of items generated by the researchers, including attachment to parents, presence of supportive figures, and involvement in social groups (Carothers et al., 2006). Another study measured interpersonal stress by having multiple experts rate some narratives obtained from semi-structured interviews with the participants (Pettit et al., 2011), while another study used observations of interactions between the participant and a parent as well as the participant and a friend (J. P. Allen et al., 2006). Finally, two studies used an instrument which assesses both social relationship structure and social support by a combination of visual mapping technique and a questionnaire (Children's Convoy Mapping Procedure). In this procedure, children place the names of the people they love in concentric circles that represent the strength of the relationship, and then answer questions about who provides specific types of social support. One limitation of this instrument is that it does not measure negative aspects of the social relationships.

Although most of the studies assessed the children's relationship with more than one person, they had predetermined number of people that children had to answer questions about, such as "a parent and another adult" (Kaynak et al., 2011). Popliger and colleagues (2009) measured children's perceived social support from family, friends, and teachers, but they assessed each role as a group rather than having children choose specific individuals. Lee and colleagues (2010) asked children about their relationships with each family member and same-sex friend, opposite-sex friend, and boy/girlfriend, but they combined the responses to form a parent group and a peer group in their analysis. Similarly, Perry (2006) collapsed foster children's relationships with parents and siblings into a single biological family network.

Therefore, these studies do not accurately depict the structure of children's social relationships, limiting our understanding of the full range of social support that a child receives.

On the other hand, two studies (Levitt, Guacci-Franco, et al., 1993; Levitt et al., 2005) used Children's Convoy Mapping Procedure which does not limit the number and category of people children can nominate and rate on the level of social support. To illustrate different aspects of social relationships, including the structure and function, the Children's Convoy Mapping Procedure in combination with the negative interactions subscale in the Network of Relationships Inventory may be useful. Combining the two measures allows for inclusion of all the people that make up a child's social network, assessment of social support provided by each person, and assessment of negative interactions with each person.

Behavioral problem measures. The most frequently used measure of children's behavioral problems was Child Behavior Checklist (Achenbach, 1991) in different formats including self-report and teacher-report questionnaires. Often researchers measure other scales' validity against Child Behavior Checklist as the standard measure of children's behavioral problems (Furlong & Wood, 1998). The caregiver version, which can be completed by staff at residential treatment centers, asks the rater to consider 112 behaviors during the past 6 months so that the measurement can capture less frequent but significant behaviors such as suicide attempts (Furlong & Wood, 1998). However, this duration also constrains who can use the instrument, as a rating by someone who has known the child for at least 6 months may be more accurate than a rating by another person who has not observed the child that long. In residential treatment centers where some children receive treatment for a very short period of time, this instrument may not be appropriate. Moreover, the length of the questionnaire may affect the willingness of staff members who may have to complete it for more than one child.

Besides this instrument, studies in this review have used other known scales that measure more specific behaviors such as depressive symptoms (e.g. Child Depression Inventory) as well as children's self-report of specific behaviors (e.g. had ever shoplifted). However, to examine the level of behavioral problems in general among foster children in residential treatment centers, it will be useful to select a scale that measures similar constructs measured by the Child Behavior Checklist, but is easier to administer to treatment staff and can measure behavioral changes in a shorter period of time. One such example is Youth Outcome Questionnaire, which has been used in children's behavioral health treatment settings (e.g. Robinson & Rapport, 2002) and has concurrent validity against the Child Behavior Checklist (Burlingame, Mosier, et al., 2001). As it measures children's behavioral problems during the past week, the Youth Outcome Questionnaire is more sensitive to behavioral changes in short treatment terms than the Child Behavior Checklist (McClendon et al., 2011). Moreover, Youth Outcome Questionnaire has different versions with varying lengths, including a 30-item questionnaire that takes 5 minutes to complete for caregivers.

Summary

The literature reviewed here suggests that various types of social relationships may have an influence on children's behavior. However, this association among foster children in residential treatment centers remains unknown. In particular, a need exists to examine both the structural properties (composition and strength of relationships) and the functional properties (social support and negative interactions) of children's social relationships, as well as how those properties change in the context of residential treatment. The convoy model of social relations developed by Kahn and Antonucci (1980) includes both of these properties and may provide a

helpful theoretical framework for examining social relationships and behavioral problems among children in residential treatment centers. The following chapter describes this model.

Chapter 3: Theoretical Review –

The Convoy Model of Social Relations

Basis of the Convoy Model of Social Relations

The convoy model of social relations ("convoy model" hereafter) developed by Kahn and Antonucci (1980) provided a framework for this study. Kahn and Antonucci viewed social relationships as changing their structure throughout a person's lifetime, and as providing social support like a "convoy," a protective escort. Attachment theory and the life course perspective informed the development of the convoy model.

Attachment theory. Attachment theory argues that a caregiver's availability and responsiveness allow a young child to feel secure and thus appreciate and maintain the relationship with the caregiver, forming "secure attachment" (Bowlby, 1988; Frey, Cushing, Freundlich, & Brenner, 2008). Further, such attachment with the caregiver influences the child's view of the self and, eventually, later relationships (Bowlby, 1969). Specifically, children who form secure attachment to their caregivers tend to view themselves as valued and to trust others (Frey et al., 2008). On the other hand, children who do not form secure attachment with their primary caregivers, especially due to removal from their caregivers, tend to view themselves as unwanted (Luke & Coyne, 2008). Thus, attachment relationship with the caregiver is seen as a prototype of later relationships in a person's life.

Researchers have expanded attachment theory in at least two ways, to include multiple attachment relationships and attachment formation beyond infancy. This is especially relevant to out-of-home care research because foster children experience multiple caregiver changes throughout childhood and adolescence. Research indicates that children can form secure attachment with more than one caregiver simultaneously, and that additional persons may

compensate for insecure attachment with the primary caregiver (Van Ijzendoorn, Sagi, & Lambermon, 1992). In addition, youth can develop secure attachment with new caregivers (e.g. foster parents), even in adolescence, through sensitive caregiving and continued relationships (Schofield, 2002).

Along these lines, Kahn and Antonucci (1980) extended attachment theory to adulthood and developed the convoy model. There are key aspects of attachment theory that were the bases of their model. First, as the child grows and expands his/her social relationships beyond the primary caregiver (most often the mother), these relationships are shaped by the qualities of the attachment in infancy. Then, in adulthood, as the individual changes roles (e.g. becomes a spouse, becomes a parent, becomes an employee), these roles require interaction with others, and therefore the individual forms different relationships. These relationships provide social support which is equivalent to attachment in infancy, in that social support provides a sense of security. Research supports that over time, children may form attachment relationships outside of the caregiving context, first with peers and then with romantic partners who fulfill different relationship functions (Nickerson & Nagle, 2005; Seibert & Kerns, 2009).

Life course perspective. The life course perspective emphasizes the influence of multiple life trajectories on human development (Elder, 1998). Four principles make up the life course perspective. First, historical context influences the life course of individuals. Second, the influence of life events on development is dependent on when they occur in the individual's life. Third, the influences of historical and personal events are shared by others through social relationships. Lastly, individuals make choices within the social context, and build their own life course (Elder, 1998). To summarize, the life course perspective examines how the individual develops over time within social contexts (Antonucci, Fiori, Birditt, & Jackey, 2010). Kahn and

Antonucci incorporated the life course perspective in their convoy model by arguing that individuals' social convoys develop and change throughout the life course. The basis for this argument was that, as people's circumstances (e.g. needs, roles) change, the appropriate type and amount of social support for each person change as well (Kahn & Antonucci, 1980). Therefore, an individual's social convoy grows with him/her.

This is easily applicable to foster children in residential treatment centers. First, historical contexts such as the current child welfare policies and the economy influence foster children's out-of-home care trajectories leading up to residential treatment. Second, moving into a residential treatment center may have a differential effect on the foster child depending on his/her developmental stage and recent experiences. For instance, if the foster child is still feeling closer to family and has hopes for reunification, moving into a large peer group may be a more stressful experience than it is for an older youth that is starting to distance himself/herself from family and sees the placement move as an opportunity to expand his/her personal network. Third, moving into a residential treatment center not only influences the foster child but also affects the child's family members, past relationships, and peers already in the residential treatment center. Lastly, within such residential treatment context, the foster child may decide to build new relationships, modify existing relationships, and make changes to his/her social convoy.

The Structure of Social Convoys: Social Network Theories

The convoy model includes three levels of relationships varying in closeness and importance to the individual. It takes the egocentric network approach rather than the sociometric approach, in that its focus is on individuals' personal networks, and those personal networks are not necessarily examined together as a network of networks. Structurally, the primary level relationships ("inner circle relationships," i.e. the closest and the most important people) are the

most stable over time and often include attachment figures. Because inclusion in the social convoy depends on the individual's perception, members in the inner circle are not necessarily people who keep in direct contact with the individual (Kahn & Antonucci, 1980). This is important to consider in research with foster children since they are away from their immediate family, who would normally be in the inner circle.

Secondary ("middle circle") and tertiary ("outer circle") relationships represent expanded social networks which may include extended family, non-kin adults, and peers. These extended networks may fluctuate over time due to changes in the life course, including non-normative ones such as being placed in a residential treatment center. Furthermore, the middle circle and outer circle relationships are likely based on roles such as neighbors and professionals and may or may not be maintained if members gain or lose their specific roles (Kahn & Antonucci, 1980). This is especially relevant for foster children in residential treatment centers because moving into one changes the roles of certain people, such as former foster care providers and school friends.

The stability of the relationships is one property of the convoy structure. Other structural properties relevant to such egocentric networks include size, tie strength, and density. In egocentric networks, size is simply the number of people in the network. Roberts, Dunbar, Pollet, and Kuppens (2009) found that there is a maximum number of relationships that an individual can have or maintain. This is because building and maintaining relationships take time, effort, and emotional commitment. Because of this upper limit on the network size, the researchers also found that individuals with a large network of kin tend to have a smaller network of non-kin (Roberts et al., 2009). In other words, people who have many relatives (over which individuals do not have control as they are born into large families) tend to have fewer non-kin relationships that they try to maintain. This may partly explain why, in early adolescence, friends tend to

replace extended family in the social convoy while the network size stays similar until adulthood (Levitt, Guacci-Franco, et al., 1993; Levitt, Weber, & Guacci, 1993).

Network size is also related to tie strength, defined as emotional closeness between individuals (Marsden & Campbell, 1984). Research indicates that individuals with large networks tend to have more weak ties (i.e., they tend to be less emotionally close to their network members) while those with small networks have more strong ties (Roberts et al., 2009). In a ground-breaking paper, Granovetter (1973) stated that weak ties increase diffusion of information, because a group of people with strong ties tend to share information only within the group. On the other hand, Valente (2010) argues that strong ties influence people's behaviors more. This is because strong ties provide role models and social support, effectively influencing people to adopt and maintain new behaviors (Valente, 2010). Because the convoy model's three levels of relationships are based on emotional closeness, it can be assumed that the ties between the individual and his/her inner circle relationships are stronger, and therefore more influential in terms of behavioral change, compared to the individual's ties to the middle circle and outer circle relationships.

Another network property that is associated with behavior is density. Density is the number of ties present in the network as a proportion of the number of all possible ties (Barnes, 1972; Haynie, 2001). Although density is most often recognized as a sociometric network property, the concept can be applied to egocentric networks. For instance, in an individual's social convoy, if most of the members know one another, the convoy would be characterized as high in density. Using a combination of egocentric and sociometric data, Haynie (2001) found that the effect of having delinquent friends on adolescents' own delinquency increases greatly if the adolescent's ego network is dense. This is particularly relevant to foster children in

residential treatment centers as children who nominate peers in the same facility as members of their social convoys will have higher density scores compared to those who do not identify peers in the same facility as their convoy members, controlling for the number of kin members nominated.

The Function of Social Convoys: Social Support Theories

Social convoys are vehicles for exchange of social support, including affective support, affirmation support, and tangible aid (Levitt, 2005). These types of social support correspond to the more widely used terms of emotional and instrumental support, respectively. Social support has two types of effects on individuals' well-being: the direct and buffering effects. Social support could have a direct effect on well-being because it increases individuals' positive feelings, sense of stability, self-esteem, and belief that problems can be solved (Antonucci & Akiyama, 1994; S. Cohen & Wills, 1985). The mechanisms for this direct effect include social-cognitive processes, explained by the theory of concept accessibility – positive or negative thoughts about a person (e.g. loving) may make a related concept (e.g. accepted) more accessible in memory, and thus affect the evaluation of the self (Rhodes & Lakey, 1999). Much literature, however, focus on the buffering effect, emphasizing the significance of social support that is apparent in times of crisis.

The buffering hypothesis states that having strong social support will moderate the detrimental effects of stress on individuals' well-being (S. Cohen & McKay, 1984). While instrumental support can be an important buffer in many instances (e.g. giving money in financial crisis), the mechanisms of emotional support may be more relevant in understanding how social relationships might help foster children in residential treatment centers cope with stress. Emotional support mechanisms include two distinct processes, one that involves sense of

belonging and the other involving self-esteem (S. Cohen & McKay, 1984). Both sense of belonging and self-esteem are basic human needs as conceptualized in Maslow's (1943) hierarchy of needs.

First, emotional support allows an individual to perceive that he/she belongs to a network of relationships, and therefore can have a buffering effect especially in times of separation or loss (S. Cohen & McKay, 1984). Sense of belonging involves feeling valued by the group that the individual is involved in (Hagerty, Lynch-Saur, Patusky, Bouwsema, & Collier, 1992). A study with young adolescents defined sense of belonging as the individual's belief that his/her active membership completes a dyad or a group, including extended family, siblings, teachers, and non-kin adults in the community (Baskin, Wampold, Quintana, & Enright, 2010). The researchers found that sense of belonging moderates the negative effects of peer rejection on loneliness, as well as of loneliness on depression (Baskin et al., 2010). In other words, under the stress of peer rejection, emotional support may alleviate feeling lonely by providing sense of belonging.

Another mechanism through which emotional support moderates the association between stress and psychosocial outcomes is by bolstering self-esteem, through similar others that provide praise and positive feedback (S. Cohen & McKay, 1984). Self-esteem is "the degree to which people see themselves as capable" and "feel they are persons of value" (Cast & Burke, 2002 , p. 1042). Such evaluation of the self is not independent from interpersonal relationships. The sociometer theory (Leary, Tambor, Terdal, & Downs, 1995) suggests that self-esteem is directly related to social inclusion/exclusion, such that self-esteem can be an indicator (thus the name socio-"meter") of whether or not a person is/feels accepted by others, which is a form of emotional support. Incorporating identity theory, Cast and Burke (2002) also argue that self-esteem increases when an individual's view of his/her role identity is congruent with another

person's view of the individual regarding that role. Because children's view of the self is still forming, children seek positive feedback from others regardless of whether they initially have positive or negative views of themselves, whereas adults with negative views of themselves tend to seek negative feedback in order to confirm that their self-views are correct (Reijntjes, Thomaes, Kamphuis, de Castro, & Telch, 2010). In other words, emotional support through positive feedback is especially important for the growing child's self-esteem. In sum, emotional support can make the individual to feel accepted for who he/she is and thus increase self-esteem, which in turn alters an individual's reaction to stress (Kammeyer-Mueller, Judge, & Scott, 2009).

S. Cohen and McKay (1984) argue that there are different types of stressors that allow emotional support to be an effective buffer against stress-induced negative outcomes. Separation from family or loss of a family member is a stressor that is obviously relevant to sense of belonging provided through emotional support. Foster children are in a constant state of ambiguous loss, which refers to the uncertainty and lack of closure about the absence of loved ones (Boss, 2007). The loved ones can be physically absent but psychologically present, or vice versa. For instance, even when the biological family members are not physically available for children in out-of-home care, they can provide relational permanence – a sense of continued belonging – for the foster children (Samuels, 2009). It is also likely that foster children, just before entering out-of-home care and while in care, experience psychological absence of family members as the family members are unable to provide nurturance (R. E. Lee & Whiting, 2007). For foster children, R. E. Lee and Whiting (2007) add another type of ambiguous loss called relationship in transition, which occurs because foster children often do not have control over the decision-making processes for their own destination such as family reunification, termination of

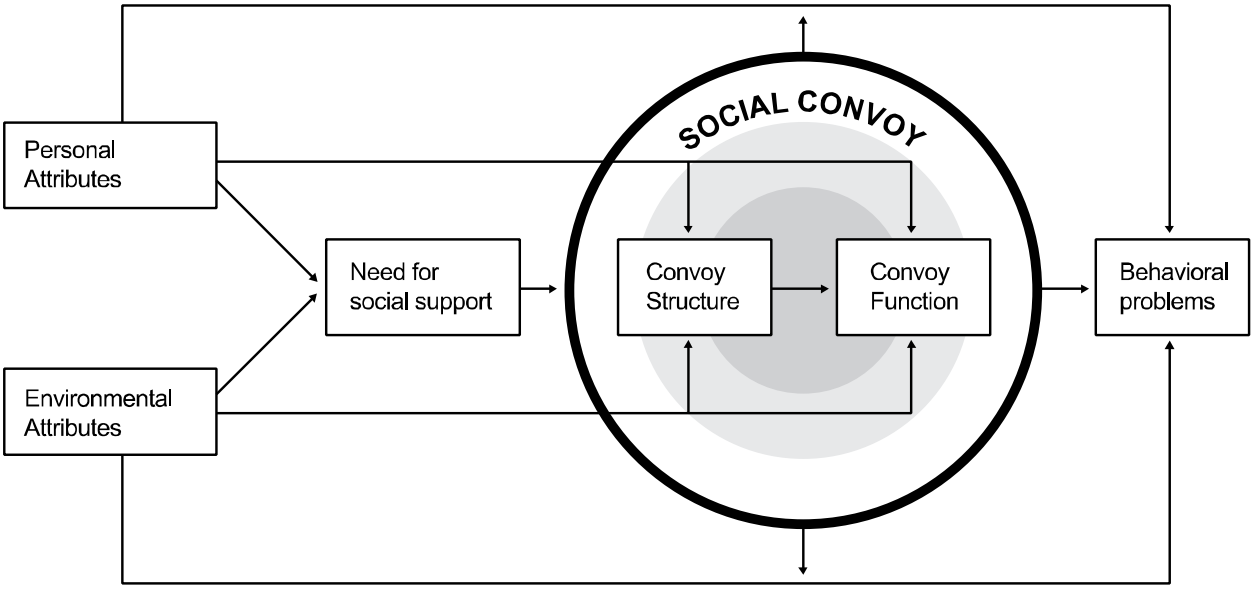
parental rights, and adoption. In such states of ambiguous loss, emotional support that provides sense of belonging may be an especially effective buffer against its negative effects.

On the other hand, the requirements for emotional support that bolsters self-esteem is not so straightforward. Certain stressors affect self-esteem while others do not. In most cases, stressful events that a person has no control over, such as natural disasters, do not result in lowered self-esteem (S. Cohen & McKay, 1984). However, an individual's perception may be an important factor in differentiating the stressors that affect self-esteem and those that do not (S. Cohen & McKay, 1984). For instance, a foster child with multiple placement changes may believe that there is something about him/herself that is causing the placement changes, resulting in a low level of self-esteem. For this child, emotional support that enhances self-esteem may become an important buffer during a placement change. On the other hand, this mechanism may not be relevant for another child who believes that others are responsible for the placement changes and, thus, shows no decrease in self-esteem.

The Mechanism of Social Convoys

Figure 3.1 shows the determinants and effects of social convoys, with arrows indicating the direction of the effects. Personal attributes (e.g. age, experience) and environmental attributes (e.g. resources, stressors) influence a person's need for social support (Kahn & Antonucci, 1980). For instance, a person going through a divorce may need different type and amount of social support from different people compared to a person who recently lost his/her job. This need for social support, along with the personal and environmental attributes, influences the convoy structure. Together with the need for social support and the personal and environmental attributes, the convoy structure affects the convoy function - the adequacy of social support received by an individual - which in turn affects life outcomes including personal well-being. Meanwhile, the

social convoy moderates the relationship between personal and environmental attributes and the life outcomes. Kahn and Antonucci (1980) emphasized two important aspects here. First, the "adequacy" of social support implies that the function of social convoys may take on a negative meaning, although the main function is a protective one. Second, when examining the structural and functional properties of social convoys, researchers should consider them both as stable properties at present and as changing properties.



Recreated from Kahn, R. L., & Antonucci, T. C. (1980). Convoys over the life course: Attachment, roles, and social support. In P. B. Baltes & O. G. Brim (Eds.), *Life Span Development and Behavior*. Vol. 3 (pp. 253-286). San Diego, CA: Academic Press. p. 270

Figure 3.1. Determinants and effects of social convoys

The Pattern-Centered Approach

Rather than examining a single variable (e.g. frequency of contact) at a time, the convoy model allows for a pattern-centered approach which takes into account the complex nature of social relationships (Antonucci et al., 2010). Such patterns are "sets of social relations variables

(e.g. network size, density, social support) that, when considered together, distinguish among major groups in a population" (Antonucci et al., 2010, p.443). Social convoy patterns can be identified in a variety of ways. For example, in a study involving youths transitioning from middle childhood to adolescence, Levitt and colleagues (2005) identified three distinct types of social convoys by looking at which combination of convoy members (e.g. close family, extended family, or peers) were providing the largest amount of social support. Studies with older adults found various types of social convoys including those that are family-focused, friend-focused, diverse (large networks and frequent contact with both family and friends), and restricted (small networks and infrequent contact with others) (Fiori, Antonucci, & Cortina, 2006; Fiori, Smith, & Antonucci, 2007).

Taking the life course perspective, Kahn and Antonucci (1980) posit that the structure and function of an individual's social convoy change chronologically and developmentally. Therefore, while within-group variations exist, different age groups have distinctive social convoys (Levitt, Guacci-Franco, et al., 1993; Levitt, Weber, et al., 1993). There is a need to develop a typology to identify convoy patterns that facilitate positive development for children in specific populations and contexts (Levitt, 2005). To date, research using the convoy model has included children of different ages and cultures, but has not given attention to foster children in residential treatment. This study, therefore, used the pattern-centered approach of the convoy model to study the social relationships of foster children in residential treatment centers. Specifically, this study aimed to present structural and functional properties of children's social convoys, their change over time, and patterns that distinguish children who show fewer behavioral problems over time from those who do not.

Research Questions

Feld, Suitor, and Hoegh (2007) suggested a framework for studying how egocentric social networks change over time (Table 3.1). Their framework included two levels of analysis (network/convoy level and tie/member level) and two types of change (the existence of ties and the nature of ties). This study applied the framework to answer the following research questions:

1. How do structural and functional properties of foster children's social convoys change during the first three months of residential treatment?
2. How do relationships between social convoy members and foster children change during the first three months of residential treatment?
3. Are there distinct types of social convoys among foster children in residential treatment centers?
4. How do foster children's social convoys relate to their behavioral problems during the first three months of residential treatment?

Table 3.1.

Framework for studying changes in social convoys

Level of analysis	Structural change	Functional change	
		Social support	Negative interactions
Convoy level (Study participant's social convoy)	• Change in network size • Change in composition • Change in density • Change in average tie strength	• Change in amount of social support	• Change in amount of negative interactions
Member level (Individuals in the social convoy)	• Which members come and go • Change in tie strength (Which members become closer to the individual)	• Which members start / continue / stop providing social support to the individual	• Which members start / continue / stop engaging in negative interactions with the individual

Chapter 4: Methods

Research Design

This prospective longitudinal survey study examined the social convoys and behavioral problems of foster children in residential treatment centers. Survey methods included structured interviews with children using a visual relationship-mapping instrument and self-administered questionnaires for child care staff at the residential treatment centers.

Sites

Two residential treatment centers in Los Angeles County in California participated in this study. Initially, the researcher identified five residential treatment centers operating in Los Angeles County with comparable size and services through internet directory search and contacted them by phone and email. Two of the residential treatment centers requested a research proposal describing the purpose of the study, methods, and implications for residential treatment practice. After reviewing the proposal, the two residential treatment centers agreed to provide the researcher with access to their clients.

Los Angeles County is divided into eight geographical regions called Service Planning Areas (SPA) for the purposes of public health planning and implementation. Both residential treatment centers that participated in this study operate in the same Service Planning Area, within several miles from each other. As mentioned before, group care facilities in California each have a Rate Classification Level (RCL) ranging from 1 to 14, indicating the intensity of services provided with 1 being the lowest and 14 the highest. In this study, both participating facilities are level 12 facilities. Each facility is part of a non-profit organization that provides a comprehensive array of services to children and families, including foster care and adoption, non-public school for special education, and community-based therapeutic services.

The first residential treatment center (Site A) serves up to 80 boys and girls between the ages of 6 and 14. The children reside in 8 cottages within the grounds of the facility, separated into groups by age and gender. Site B has 5 cottages on the grounds and serves up to 50 boys and girls aged 7 to 18 with similar groupings by age and gender. At both residential treatment centers, one assigned clinician and a cottage supervisor counsel/manage each cottage, with multiple child care workers working in shifts.

In 2007, California Assembly Bill 1453 authorized a demonstration project called Residentially Based Services (RBS) to transform residential treatment centers. The main features of the RBS are intensive therapeutic services with shortened length of stay, parallel community services, intensive family finding and involvement, and post-residential follow-up services (Hay & Franz, 2013). Four counties including Los Angeles County participated, and the two residential treatment centers in this study both participated in the demonstration project. Each site converted two 10-bed cottages to use for the RBS program, and services began in December 2010. At Site A, both RBS cottages were for boys, while Site B had one for boys and one for girls. Foster children could enter the RBS program either from within the residential treatment center (i.e. transfer from a non-RBS cottage) or from a different foster care placement. Thus, some study participants transferred to an RBS cottage during the study period.

Recruiting Procedure

The Institutional Review Board (IRB) at the University of California, Los Angeles approved the study protocol. The inclusion criteria for the youth sample were: (a) newly admitted into one of the participating residential treatment centers within the past month, (b) has an open juvenile dependency case in Los Angeles County, and (c) 9 to 13 years of age at the time of admission. The researcher chose this age range to capture the role of social convoys during the

transition from middle childhood to adolescence. An increased risk for behavioral problems exists during this period (Steinberg, 2004; Wang & Dishion, 2011). Further supporting this assertion, Levitt and colleagues (2005) also studied social convoys of children in this age range: "Variations in support patterns are likely to be especially meaningful for adjustment during this unsettling time" (p.400).

Since the eligible children were wards of the county, the researcher obtained permission from the county child welfare department and the juvenile dependency court to include them in this study. In addition, the researcher obtained a waiver to eliminate the parental informed consent process, because the participating residential treatment centers do not routinely have access to the parents of their clients. In some cases, the parents are missing, incarcerated, or may lack the competence to provide informed consent (e.g. under the influence of drugs). Many children have histories of child abuse and neglect by their parents. Without the waiver of parental informed consent, this study would have likely ended up with a biased group of children whose parents are actively involved in the treatment process. Appropriate child assent procedure was in place according to the IRB standards.

From the two participating residential treatment centers, the researcher recruited newly admitted foster children for thirteen months from September 2012 to September 2013. Whenever a child fitting the study criteria entered one of the residential treatment centers, a designated staff member notified the researcher by phone or email. At each site, the designated staff member held a managerial position overlooking the residential treatment services. Following the juvenile dependency court order, the researcher sent a written notification to the child's attorney that the potential participant will be contacted. Next, the researcher set up an appointment to meet with the child individually for recruitment. The first meeting occurred within one month of the child's

admission. One attorney asked that her client be removed from this study, as the client was experiencing a difficult transition and would not be able to make an informed decision. Three attorneys contacted the researcher to ask for more information about the study but allowed the researcher to continue working with their clients.

After obtaining child assent, the researcher met with the child's primary child care worker to ask him/her to participate in this study. The managing staff who helped with child participant recruitment identified the most appropriate child care worker for each child. The selection criterion was that the child care worker spends the most amount of time with the child daily. In all, 13 child care workers (6 from Site A and 7 from Site B) participated in the study.

Sample

The study sample included 38 foster children. Thirty-one foster children from Site A and seven foster children from Site B participated. From Site A, the researcher could not consent 6 eligible children. Two boys refused to participate, one girl was discharged within one week of admission, one girl did not speak any English, and two boys were not present each time the researcher attempted to contact them. One of the boys ran away from the residential treatment center on each of the three days that the researcher visited. The other boy, who entered treatment during the summer break, was on an outing on each of the three days that the researcher attempted to meet with him.

Table 4.1 shows the study sample characteristics. The sample included more boys (58%) than girls (42%), similar to the percentages of boys (59%) and girls (41%) who entered group homes[5] in Los Angeles County during the study period (Needell et al., 2014). Forty-seven percent of the participants were African American, 34% Latino/a, 13% Caucasian, and about 5%

[5] "Group homes" in California include facilities of any size providing 24-hour care, supervision, and services for children and adolescents (California Department of Social Services, 2007). Residential treatment centers described in this research are a subset of group homes. Data on residential treatment centers only were unavailable.

were of other or mixed ethnicity. Compared to the Los Angeles County group home data (Needell et al., 2014), Latino/a youths are underrepresented by about 9 percent. The mean age at intake was 11.97 years (SD = 1.17). Twelve and thirteen year-olds made up 74% of the sample, which was probably due, in part, to a child welfare department policy change that minimized placing children younger than 12 years of age in group care. This policy change occurred just before data collection began. The majority (76%) of the participants were in 6^{th}, 7^{th}, and 8^{th} grades and 68% attended regular public schools. Seven participants attended public special education or alternative schools, while five participants went to non-public schools on site.

On average, the participants had more than 4 previous out-of-home placements (mean = 4.81, SD = 3.54, range 0~13) and spent more than 4 years in out-of-home care (mean = 4.62, SD = 3.83, range 0~13 years). Most participants had experienced neglect (84%) or physical abuse (74%) at some point before residential treatment. Slightly less than half (45%) of the participants had experienced emotional abuse, while seven participants (18%) had experienced sexual abuse. More than 75% of the participants had a history of more than one type of child maltreatment. The most frequently co-occurring child maltreatment types were physical abuse and neglect (10 participants) and physical abuse, emotional abuse, and neglect (9 participants).

Of the 38 participants, 11 participants (9 from Site A and 2 from Site B) transferred to a Residentially Based Services (RBS) cottage within the same facility between the initial interview and the follow-up. All except one from Site B were male. One participant from each site transferred to a different cottage (Non-RBS to Non-RBS) due to developmental needs. Three participants from Site A were discharged within three months of admission before the follow-up interview. The majority of participants (79%) had psychotropic medication at some point during

the study period. This percentage is similar to the 78% medication use reported in an independent study at multiple sites across the country (Baker, Archer, & Curtis, 2007).

No statistically significant differences existed between the two facilities in terms of the participants' gender, ethnicity, age, number of years in out-of-home care, child maltreatment history, transfer to RBS, and use of psychotropic medication. However, participants in Site A had fewer previous out-of-home placements compared to participants in Site B (4.07 versus 8.00 placements, $z = -2.617$, $p < .01$).

Table 4.1.

Sample characteristics (N = 38)

Demographic variables		Child welfare variables	
Mean (SD)		**Mean (SD)**	
Age	11.97 (1.17)	Number of previous placements	4.81 (3.54)
		Number of years in out-of-home care	4.62 (3.83)
Frequency (%)		**Frequency (%)**	
Gender		Child maltreatment experienced	
Boys	22 (58%)	*Physical abuse*	28 (74%)
Girls	16 (42%)	*Emotional abuse*	17 (45%)
Ethnicity		*Sexual abuse*	7 (18%)
African American	18 (47%)	*Neglect*	32 (84%)
Latino/a	13 (34%)	Number of child maltreatment types	
Caucasian	5 (13%)	*None*	2 (5%)
Other/mixed	2 (5%)	*Experienced 1 type only*	7 (18%)
Grade		*Experienced 2 types*	13 (34%)
3rd grade	3 (8%)	*Experienced 3 types*	13 (34%)
5th grade	2 (5%)	*Experienced 4 types*	3 (8%)
6th grade	9 (24%)		
7th grade	11 (29%)		
8th grade	9 (24%)		
9th grade	4 (11%)		
Type of school		Residential treatment variables	
Public elementary	3 (8%)	**Frequency (%)**	
Public middle school	20 (53%)	Took any psychotropic medication during study period	30 (79%)
Public high school	3 (8%)	Transferred to residentially based services (RBS) program	11 (29%)
Public special education	7 (18%)		
Non-public school	5 (13%)		

Measures

Children's Convoy Mapping Procedure. The Children's Convoy Mapping Procedure (Levitt, Guacci-Franco, et al., 1993) provided a measure of the children's social relationships. It is a visual instrument adapted from the adult convoy measure (Antonucci, 1986) and takes about 40 minutes to administer. The researcher placed a circular sticker with the word "Me" in the center of a blank convoy diagram picturing three concentric circles. With prompting, the child placed in the innermost circle of the convoy diagram "people who are the most close and important to you – people you love the most and who love you the most" to indicate their primary relationships. For each identified person, a sticker on the diagram had their initials, nicknames, or relationships (e.g. Uncle J.). The middle circle included the secondary relationships, "who are not quite as close but who are still important – people you really love or like, but not quite as much as the people in the first circle." The outer circle included the tertiary relationships, "who are not as close as the others, but who are still important – people you still really love or like, but not quite as much as the people in the middle circle." After the child identified all relationships, he/she indicated if any of the people in the convoy diagram know one another. If so, a line linked their respective stickers. In the cases where there were many connections within a convoy that made it complicated, the researcher wrote down notes such as "A knows all family members except B."

Next, the child identified persons in the diagram who provide each of six social support functions. These social support functions tap the domains of affective support, affirmation support, and tangible aid described in the convoy model. Affective support and affirmation support represent emotional support in other literature. Questions addressing these social support functions were (Levitt, Guacci-Franco, et al., 1993):

1. Are there people who like to be with you and do fun things with you? (affective support)
2. Are there people who make you feel special or good about yourself? (affective support)
3. Are there people you talk to about things that are really important to you? (affirmation support)
4. Are there people who make you feel better when something bothers you or you are not sure about something? (affirmation support)
5. Are there people who would take care of you if you were sick? (tangible aid)
6. Are there people who help you with homework or other work that you do for school? (tangible aid)

In addition to the original procedure, the researcher asked the child to identify persons in the diagram who provide negative interaction functions such as conflict and criticism. The following questions are from Negative Interactions subscale of Furman and Buhrmester's (2009) Network of Relationships Inventory – Behavioral Systems Version (NRI-BSV). While NRI-BSV asks questions regarding a specific individual (e.g. how much do you and this person get upset with or mad at each other?), in this study, modified questions followed the format of the Convoy Mapping Procedure. The researcher used two items out of the six original items that represent conflict and criticism to simplify the procedure for children in this study.

1. Are there people who you get upset with or mad at each other? (conflict)
2. Are there people who say mean or harsh things to you? (criticism)

The researcher wrote down the initials of the people in the convoy diagram and the social support and negative interaction functions they provide, if any, on a separate form (Appendix B). The researcher also asked the child about the relationship role (grandmother, friend, etc.) of each

person in the convoy diagram and recorded the roles on the form. Lastly, the researcher recorded whether or not each person resides in the same residential treatment facility (peers or staff).

The test-retest reliability of the Children's Convoy Mapping Procedure is .90 for the total number of individuals in the convoy, and the mean test-retest reliability for the number of people in each of the three relationship levels is .75 (Levitt, Guacci-Franco, et al., 1993). This mean is higher at .81 if the tertiary level (.38) is eliminated because, according to the convoy model, the relationships in the tertiary level tend to fluctuate over time (Levitt, Guacci-Franco, et al., 1993).

Youth Outcome Questionnaire 30. The Youth Outcome Questionnaire 30 (Y-OQ-30; Burlingame, Jasper, et al., 2001) provided a measure of children's behavior. The Y-OQ-30 measures treatment progress of 4 to17 year-olds receiving behavioral health services. Parents or caregivers complete 30 items on a 5-point Likert scale in about 5 minutes. It asks the respondent to decide how true each statement is for the child during the past seven days. The response categories are "never or almost never true = 0," "rarely true = 1," "sometimes true = 2," "frequently true = 3," and "almost always or always true = 4." Total scores range from 0 to 120, with higher total scores indicating more behavioral problems. The staff members at both residential treatment centers were familiar with this format as both centers have used the longer version of this scale before.

The Y-OQ-30 covers areas of somatic symptoms, social isolation, conduct problems, aggression, hyperactivity/distractibility, and depression/anxiety (Burlingame et al., 2004; Burlingame, Jasper, et al., 2001). The difference between conduct problems and aggression is that conduct problems mainly address breaking social rules while aggression is more about physical violence (Burlingame et al., 2004). Some examples of items are as follows:

1. Complains of stomach pain or feeling sick more than others of the same age (Somatic)

2. Doesn't have or keep friends (Social isolation)
3. Deliberately breaks rules, laws, or expectations (Conduct problems)
4. Physically fights with adults (Aggression)
5. Has a hard time concentrating, thinking clearly, or attending to tasks (Hyperactivity/distractibility)
6. Appears sad or unhappy (Depression/anxiety)

Somatic symptoms, social isolation, and depression/anxiety items capture internalizing behaviors, while the other three areas measure externalizing behaviors. These domains are highly correlated with comparable subscales of the Child Behavior Checklist (CBCL; Achenbach, 1991), a widely used diagnostic measure of child behavior (Burlingame, Mosier, et al., 2001). The researcher chose YO-Q-30 over CBCL because it is shorter (30 items vs. 113 items) and is easier to administer to residential treatment staff with multiple children in care. In addition, the Youth Outcome Questionnaire is more sensitive to short-term behavioral change in clinical settings than CBCL when filled out by the caregiver (McClendon et al., 2011).

The internal consistency reliability of this measure assessed by Cronbach's alpha was .92 for a large sample of youth receiving behavioral health services (Dunn, Burlingame, Walbridge, Smith, & Crum, 2005). Test-retest reliability for a community sample was .80 while inter-rater reliability between two parents was .71 (Dunn et al., 2005). Lastly, this measure can correctly differentiate clinical and non-clinical youth 84 percent of time, indicating good known-groups criterion validity (Dunn et al., 2005).

The Y-OQ-30 has an established cutoff score to differentiate clinical levels and normal levels of behavioral problems. The cut-off score for the Y-OQ-30 caregiver version is 29 based on large and diverse normative samples including inpatient, outpatient, and community youths

(Burlingame et al., 2004). Scores at or above 29 indicate clinical levels of behavioral problems. The reliable change index (RCI), devised by Jacobson and Truax (1991), also measures clinical progress by determining whether the change in outcome score between two time points is clinically significant, while controlling for measurement error in repeated tests (Burlingame et al., 2004; Jacobson & Truax, 1991). The RCI value for the Y-OQ-30 is 10, meaning that score changes of 10 points or more indicate clinically significant change beyond measurement error.

Administrative data. This study used existing administrative data from the participating residential treatment centers to supplement the social relationship and behavioral problem measures. Using existing records has the advantages of being efficient and less intrusive to participants (Mirabito, 2001). The designated staff who helped with recruiting participants provided past data at the time of the baseline interviews and treatment data after the completion of all follow-up interviews.

Out-of-home care and child maltreatment history. The researcher obtained child participants' number of previous out-of-home care placements and the total number of years in out-of-home care as indicators of severity of behavioral health needs, which should be controlled for in studying the outcome of behavioral problems (Hair, 2005; Landsman et al., 2001). In addition, the residential treatment centers provided information on the types of child maltreatment that the participants experienced before intake. The specific types included physical abuse, emotional abuse, sexual abuse, and neglect. Child maltreatment history is important for this study because each of the different types as well as the co-occurrence of multiple types of child maltreatment may differently affect both social relationships and behavioral problems (Kim & Cicchetti, 2010). To extract out-of-home care and child maltreatment history, the designated staff at each residential treatment center used case notes at

intake. Many of the participants had complex trajectories involving several foster care placements over a long period of time. Therefore, some missing values exist and the final data may not be completely accurate. Using case notes typically has validity and reliability issues (Lalayants, Epstein, & Adamy, 2011). However, sometimes other types of data, such as child self-report, are either unavailable or inconsistent, and researchers have relied on case notes to collect information about foster children's past (Baker & Purcell, 2005; Osborn, Delfabbro, & Barber, 2008).

Family composition and visitation records. Since the Children's Convoy Mapping Procedure relies on self-report of the perception of one's own social relationships, the researcher obtained administrative data on the participants' actual family composition. The residential treatment centers provided information on the types of parental figures that each participant had in the past and the number of siblings. Parental figures included any adult kin who provided a home for the participant, such as biological parents, stepparents, adoptive parents, and relatives. In addition, the researcher obtained the participants' visitation records during the second and third months of treatment. The researcher did not include the first month of treatment because of incomplete data. During the first month, the residential treatment center reports an initial 30-day assessment for which visitation records are not mandatory. In some cases, children do not have immediate visitation approval by the court. After the initial assessment, the residential treatment center keeps visitation records in quarterly reports. The residential treatment centers provided the visitors' initials, relationship roles (e.g. mother), and their visit dates. The purpose was to link these data and the participants' social convoy data to find out if there is any association between the participants' perception of social relationships and actual contact.

Use of psychotropic medication. The participating residential treatment centers provided information on whether or not each participant took any psychotropic medication during the study period. Such medication use during the first few months of residential treatment may indicate the level of behavioral health needs at the time (Baker, Archer, et al., 2007). Therefore, the researcher collected this information to supplement the behavioral problem measure which relies on the perception of the child care staff.

Data Collection Procedure

The researcher individually met with each child within one month of his/her admission (baseline) to complete the Children's Convoy Mapping Procedure (mean = 15.05 days, SD = 7.10). At both sites, interviews were conducted in private in a therapy room, a meeting room, an office, or the patio when no one was nearby. In some cases the staff asked that the door be not completely shut for the researcher's safety. The instrument required the researcher to read aloud each item and guide the child through the multiple-step process. The interviews took 15 minutes to one hour depending on how many people the child identified as close and important. The researcher administered the same procedure again three to four months (follow-up) after the baseline interview. The average time between the baseline interview and the follow-up interview was approximately 3.5 months (mean = 104.91 days, SD = 8.42).

At baseline and at follow-up for each child participant, the researcher delivered the Youth Outcome Questionnaire 30 (YO-Q-30) to the child care worker who is primarily responsible for his/her care at the residential treatment center and agreed to participate. Most child care workers had to fill out the questionnaire for more than one child (range 1 ~ 12), at different time points, depending on the admission rate and timing. Each questionnaire took about 5 to 10 minutes to complete. In some cases, the child care worker asked the researcher to wait while he/she

completed the questionnaire. In other cases, the researcher gave an envelope to the child care staff so he/she could submit the completed questionnaire to the managerial staff who helped with recruiting. The researcher returned to the residential treatment center in at least a week to collect the completed forms. In some cases, it took more than one week for the child care staff to complete and return the questionnaires. The mean number of days between the baseline child interview and the baseline YO-Q-30 was 5.03 (SD = 5.64) and the mean number of days between the follow-up child interview and the corresponding YO-Q-30 was 4.26 (SD = 4.72).

Analysis

This study used various statistical and social network analytical methods. For statistical analysis, the researcher entered data in Stata 13 (StataCorp, 2013b). For social network analysis, the researcher formatted and imported data in E-Net (Borgatti, 2006) to compute network statistics and in Netdraw (Borgatti, 2002) for visualization. The data were multilevel in nature – social convoy members nested within children (social convoys), who are nested within facilities. In addition, data collection occurred at two time points, so there were observations nested within convoy members and observations nested within children. Some descriptive analyses involved examining data only at the member level or at the convoy level. In other cases, analyses involved both levels.

Variables.

Network size and composition. Network size is the total number of people in the child's social convoy. This is a convoy-level continuous variable with no upper limit. Network composition refers to the manner in which different relationship roles combine to make up a social convoy. Various relationship roles appeared at first in the child participants' words, but then the researcher categorized them into parents, siblings, extended family, non-family adults,

and peers. Analysis of the network composition included examining the proportion of kin (parents, siblings, and extended family) and non-kin (non-family adults and peers) members, the proportion of peers, and the proportion of males and females within the social convoy. In addition, analysis examined social convoys that included members from within the facility (residential staff and peers). Lastly, member turnover measured by the percentage of baseline members who were no longer members at follow-up indicated the level of structural stability of the social convoy.

Tie strength. The interview procedure asks the child to name people who are close to him/her in varying levels. Thus, tie strength represents the emotional closeness between the child and his/her social convoy member. In this study, individuals in the primary level (i.e. inner circle) received a tie strength score of 3, and individuals in the secondary (middle circle) and tertiary (outer circle) levels received tie strength scores of 2 and 1, respectively. Adding all of the tie strength scores and then dividing the sum by the total number of people in the social convoy produced the child's average tie strength at the convoy level. For example, if a child identified one person in the inner circle, three people in the middle circle, and five people in the outer circle, his average tie strength would be [(1 person x 3 points) + (3 people x 2 points) + (5 people x 1 point)] ÷ 9 people = 1.56. Tie strength was included in both member level (individual score) and convoy level (average) analyses.

Network diversity. Network diversity, a convoy level variable, indicates the amount of variation within a social convoy regarding specific variables (Agresti & Agresti, 1978). This study used Agresti's index of qualitative variation (IQV) to calculate network diversity with respect to relationship roles and gender of the social convoy members. The formula for the IQV is:

$$IQV = [k/(k-1)]*[1-\sum_{i=1}^{k} p_i^{\,2}]$$

where k = number of categories in the variable of interest; i = 1, ……, k; p_i = the proportion of observations in the ith category of the variable of interest.

An IQV value of zero indicates a homogeneous social convoy, while an IQV value of one indicates equal proportions of all available categories of the variable (K. Lewis, Kaufman, Gonzalez, Wimmer, & Christakis, 2008; Valente, 2010). For example, if a social convoy has 50% men and 50% women, the network diversity is [2/(2-1)]*[1-(.25+.25)] = 1. On the other hand, if a social convoy has 10% men and 90% women, the network diversity is [2/(2-1)]*[1-(.01+.81)] = .36. With regard to relationship roles, the network diversity measured by IQV indicates the degree to which the social convoy contains equal proportions of various relationship roles (parents, siblings, extended family, non-family adults, and peers) present.

Network density. Network density, another convoy level variable, indicates the proportion of the number of ties out of all possible ties. In this study, the ties between the child and his/her social convoy members are excluded from the equation. Rather, the density includes the members only, specifically what proportion of the members knows one another. Density is a count of the number of ties (number of lines on the convoy diagram completed by the child) divided by the number of all possible ties. For example, if a child has 5 members in his/her social convoy, the number of all possible ties is 10. With four acquaintances, the density score is .4 (Figure 4.1).

Social support and interpersonal stress variables. The functional properties of children's social convoys included social support and negative interactions received from the social convoy members. Each social convoy member received a social support score ranging from 0 (providing none) to 6 (providing all six social support functions) and a negative interactions score ranging

from 0 (no negative interaction) to 2 (both types of negative interactions). Member level analyses used these scores. For convoy level analyses, the mean social support and mean negative interaction scores derived from dividing the sum of all convoy members' individual scores by the network size. Other calculations included the mean social support and mean negative interaction scores by each relationship category (parents, sibling, extended family, non-family adults, and peers). For example, adding all of the child's parents' social support scores and then dividing it by the number of parents included in the child's convoy resulted in the mean social support from parents.

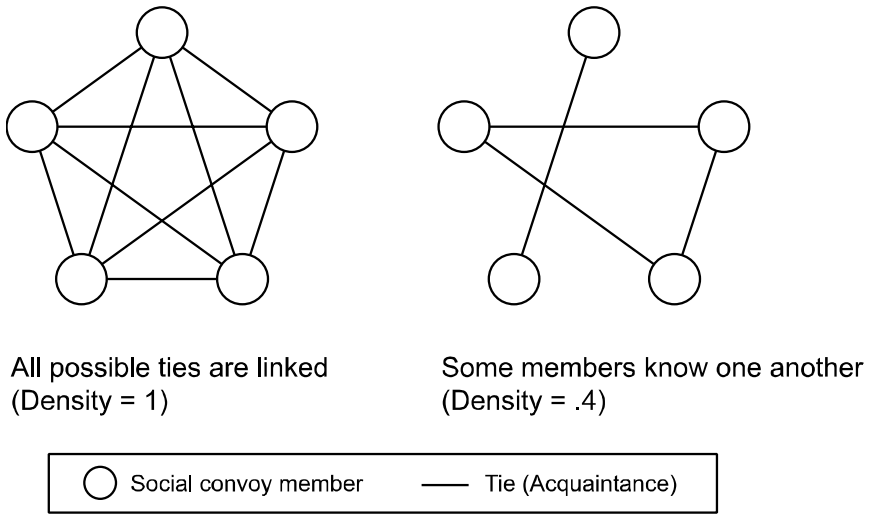


Figure 4.1. Illustration of network density

Convoy-level description. For descriptive analyses at the social convoy level, the researcher used nonparametric methods due to small sample size and unknown distribution of the variables in the population. For instance, to compare the means of two independent groups, the researcher used Wilcoxon Mann-Whitney test instead of independent samples t-test.

Member-level description. The description of social convoy members involved multilevel analyses. The researcher mainly used Stata's *xt* commands for analyzing panel data, and *me* commands for multilevel mixed effects models (StataCorp, 2013a). For two-level analyses involving social convoys and their members, random intercept models allowed for correlations among members of the same social convoy, thus minimizing inaccurate estimation of standard errors and p-values (Rabe-Hesketh & Skrondal, 2012). For three-level analyses (social convoys, members, and time points), multilevel mixed effects models controlled for correlations between observations of the same member over time as well as between members of the same social convoy. Random and mixed effects models included linear regression, logistic regression, and ordered logistic regression analyses according to the measurement level of the outcome variables.

Social convoy types. A series of cluster analyses allowed exploration of social convoy types based on their structural and functional properties. The researcher followed the steps used in previous social network literature (Fiori et al., 2007). First, since the social convoy variables were on different scales, the researcher standardized the variables prior to conducting cluster analysis. Next, hierarchical cluster analysis using Ward's method (Ward, 1963) helped determine the appropriate number of clusters for the sample. In this type of cluster analysis, each case (i.e. social convoy) is a cluster by itself in the beginning. Then the procedure repeatedly joins two clusters in a way that minimizes the within-cluster variance until only one cluster remains. One issue with hierarchical cluster analysis concerns how merged clusters in earlier steps remain together until the end, so a poor joining in the early stage of the analysis can produce suboptimal cluster solutions (Aldenderfer & Blashfield, 1984; Asendorpf, Borkenau, Ostendorf, & van Aken, 2001). For this reason, researchers have used hierarchical cluster analysis to only determine the

appropriate number of clusters and then use K-means cluster analysis to identify the distinct groupings (Levitt et al., 2005). The K-means cluster analysis method first randomly selects a pre-specified number of cases (i.e. social convoys) as initial clusters. Then it adds cases to the cluster that has the most similar characteristics (similarity is determined by the mean of selected variables of interest). After adding cases, the procedure computes new cluster means and then moves some cases so that the difference between each case and its cluster mean is minimum. The last two steps repeat until no cases move from one cluster to another (Aldenderfer & Blashfield, 1984).

A clear guideline regarding the minimum sample size for cluster analysis is lacking. However, some recommend using the formula from latent class analysis: 2^k, where k is the number of clustering variables (Mooi & Sarstedt, 2011). In this study, the researcher selected five social convoy variables (network size, average tie strength, network density, average social support, and the proportion of social support from each relationship category) as clustering variables. Thus, the sample size of 38 met the minimum requirement for cluster analysis (2^5 = 32). However, such sample size determination does not guarantee the quality of clustering outcome because cluster analysis always produces a result regardless of the sample size and number of variables (Mooi & Sarstedt, 2011). Due to the small sample size, this study used cluster analysis only as a guideline to explore what types of social convoys existed in the current sample of foster children in residential treatment centers.

Chapter 5: Social Convoys

Research Question 1: How do structural and functional properties of foster children's social convoys change during the first three months of residential treatment?

Structural Properties of Social Convoys

The structural properties of social convoys examined in this study include network size, composition, average tie strength, diversity, and density. Table 5.1 presents the descriptive statistics of these properties at baseline and at follow-up with nonparametric statistical test results for paired comparisons between the two time points. Statistical analysis also included cross-sectional correlations with various sample characteristics (e.g. demographics, out-of-home care history) at each time point.

Network size.

Network size of the entire social convoy. At baseline, the mean network size for all participants (N = 38) was 13.58 (SD=7.84, range 3~36; Table 5.1). A statistically significant gender difference existed in network size at baseline, Wilcoxon Mann-Whitney test, $z = 2.148$, $p < .05$. The mean network size for girls was 17.38 (SD = 9.51) while the mean network size for boys was 10.82 (SD = 4.98).

At follow-up, 35 participants remained in the study. Three participants discharged from the residential treatment center within three months of entering treatment. Of the remaining 35 participants, one participant nominated nobody in his social convoy. Analyses excluded this participant, because it was impossible to compute the value of some variables (e.g. network density is impossible to compute if network size is 0 or 1). The mean network size for the 34 participants at follow-up (mean = 12.29, SD = 9.71, range 1 ~ 42) was not significantly different

from the mean network size at baseline. The gender difference in network size no longer existed at follow-up.

Table 5.1.

Social convoy structure at baseline and at follow-up

	Baseline (N = 38)			Follow-up (N = 34)		
Structural properties	Mean (SD)	Median	Range	Mean (SD)	Median	Range
Size						
Social convoy	13.58 (7.84)	11.00	3 ~ 36	12.29 (9.71)	10.00	1 ~ 42
Inner circle [a]	5.58 (3.48)	5.00	1 ~ 18	5.21 (3.55)	4.00	1 ~ 16
Middle circle [b]	5.00 (4.49)	4.00	0 ~ 23	4.24 (5.21)	3.00	0 ~ 25
Outer circle [c]	3.00 (3.62)	2.00	0 ~ 17	2.85 (4.05)	1.50	0 ~ 18
Composition						
Number of						
Parents	1.76 (0.94)	2.00	0 ~ 4	1.62 (0.85)	2.00	0 ~ 4
Siblings	2.39 (1.98)	2.00	0 ~ 10	2.68 (2.23)	2.50	0 ~ 11
Extended family	4.63 (3.99)	3.00	0 ~ 15	3.65 (4.19)	2.00	0 ~ 19
Non-family adults	1.53 (2.26)	0.00	0 ~ 9	1.62 (4.05)	0.00	0 ~ 19
Peers	3.24 (4.41)	2.00	0 ~ 19	2.74 (4.15)	1.00	0 ~ 18
Proportion of kin*	.68 (.26)	.69	.18 ~ 1.00	.73 (.26)	.79	0 ~ 1.00
Proportion of peers*	.22 (.23)	.17	0 ~ .82	.17 (.20)	.10	0 ~ .64
Proportion of females	.55 (.15)	.55	.25 ~ .86	.57 (.17)	.55	.33 ~ 1.00
Tie strength	2.27 (0.36)	2.56	1.61 ~ 3.00	2.33 (0.42)	2.38	1.67 ~ 3.00
Diversity						
Diversity of roles	.85 (.18)	.91	0 ~ 1.00	.84 (.21)	.89	0 ~ 1.00
Diversity of gender	.90 (.12)	.96	.49 ~ 1.00	.87 (.24)	.97	0 ~ 1.00
Density	.67 (.27)	.66	.14 ~ 1.00	.73 (.25)	.76	.33 ~ 1.00

Note. Statistical comparison is Wilcoxon signed rank sum test between baseline and follow-up.
[a] People who are "the most close and important" to participant. [b] People who are "not quite as close but who are still important" to participant. [c] People who are "not as close as the others, but who are still important" to participant.
* $p < .05$

Network size of each concentric circle. At baseline, more than five members were in the inner circle (mean = 5.58, SD = 3.48, range 1~18; Table 5.1). The mean number of middle circle members was 5 (SD = 4.49, range 0~23), and the mean for the outer circle was 3 (SD=3.62, range 0~17). Boys and girls differed in the number of members in the middle circle only. Girls

included close to seven people in the middle circle (mean = 6.94, SD = 5.69) while boys included about three people in the middle circle (mean = 3.59, SD = 2.74), Wilcoxon Mann-Whitney test, $z = 2.045$, $p < .05$.

The mean number of members in each circle at follow-up did not significantly differ from the baseline means. At follow-up, slightly more than 5 social convoy members were in the inner circle (mean = 5.21, SD = 3.55, range 1 ~ 16) and the mean number of middle circle members was 4.24 (SD = 5.21, range 1 ~ 25). Less than 3 members were in the outer circle (mean = 2.85, SD = 4.05, range 0 ~ 18).

Network composition.

Relationship categories. The mean number of each relationship category in the social convoy did not change significantly from baseline to follow-up (Table 5.1). At both baseline and follow-up, extended family members were in a child's convoy most frequently, followed by peers and siblings. The majority of participants had at least one parent in their social convoy at both baseline (92%) and follow-up (91%). Eighty-six percent at baseline and 82% at follow-up included at least one sibling in their social convoy. Similarly, most participants included at least one extended family member at baseline (92%) and follow-up (85%).

Less than half (45% at baseline and 38% at follow-up) of the participants included non-family adults in their social convoy. For these participants, non-family adults made up 20% of the social convoy at baseline and 24% at follow-up. Over half of the participants had at least one peer in their social convoy at both baseline (66%) and follow-up (62%). Peers made up 34% (baseline) and 28% (follow-up) of the social convoys of these participants.

Proportion of kin. The next set of analyses examined the proportion of kin, including parents, siblings, and extended family, at the social convoy level. The mean proportion of kin for

the study participants at baseline was 0.68 (SD = 0.26, range 0.18~1.00). Boys included more kin in their social convoys than did girls (78% versus 54%) at baseline, Wilcoxon Mann-Whitney test, $z = -2.963$, $p < .01$. At follow-up, the proportion of kin increased to .73 (SD = .26, range 0 ~ 1). This increase was statistically significant, Wilcoxon signed rank sum test, $z = -2.117$, $p < .05$ (Table 5.1). Further analysis revealed that only girls' proportion of kin increased significantly (from 54% to 67%), $z = -2.354$, $p < .05$. Moreover, the proportion of kin significantly increased over time for participants aged 12 or older (from 70% to 80%, $z = -2.920$, $p < .01$) but not for younger participants. Lastly, change in the proportion of kin related to the number of child maltreatment types (physical abuse, emotional abuse, sexual abuse, and neglect) experienced by the participant. For participants who experienced less than 3 child maltreatment types, the proportion of kin in their social convoys increased significantly from 68% to 75%, $z = -2.218$, $p < .05$. However, the proportion of kin did not change significantly over time for participants who experienced 3 or 4 child maltreatment types.

Proportion of peers. Peers in the social convoys included any non-kin non-adult member that the participants described as friend, boyfriend/girlfriend, or foster sibling. The mean proportion of peers within the social convoy decreased from .22 (SD = .23, range 0 ~ .82) at baseline to .17 (SD = .20, range 0 ~ .64) at follow-up, Wilcoxon signed rank sum test, $z = 2.107$, $p < .05$ (Table 5.1). Further examination of this difference revealed that while boys' proportion of peers remained almost the same (13% at baseline and 15% at follow-up), girls' proportion of peers decreased from 36% at baseline to 21% at follow-up, $z = 2.731$, $p < .01$. In fact, girls reported significantly more peers in their social convoy at baseline compared to boys (mean 5.88 versus 1.32), Wilcoxon Mann-Whitney test, $z = 3.561$, $p < .01$. Gender difference in the number or peers no longer existed at follow-up as girls and boys nominated about 3 and 2 peers each.

The proportion of peers significantly decreased over time for participants with less than 3 child maltreatment types only (from 23% to 15%), Wilcoxon signed rank sum test, $z = 2.317$, $p < .05$.

Gender composition. At both baseline and follow-up, slightly more than half (55%) of all social convoy members were female. At baseline, no one had a social convoy entirely composed of one gender, and the mean proportion of females in the social convoy was .55 (SD = .15, range .25~.86). No gender difference in the proportion of females existed. However, the difference in the proportion of females between participants in the two facilities was statistically significant, Wilcoxon Mann-Whitney test, $z = -2.280$, $p < .05$. At Site A, the mean proportion of females in the social convoy was .52 (SD = .14, range .25~.79), while the mean proportion of females for Site B participants was .67 (SD = .17, range .42~.86).

At follow-up, the mean proportion of females in the social convoys was .57 (SD = .17, range .33 ~ 1.00). This was not significantly different from the mean proportion at baseline. Two participants had social convoys composed of female only, one with only one member and the other with two members. The proportion of females did not differ by site or by participant's own gender.

Staff and peers at the residential treatment center. At baseline, 14 participants (37%) included 37 people that were either staff (7) or peer (30) at their residential treatment center. For those 14 participants, staff or peers made up 22% of their social convoy on average. Nine participants included only peers, ranging from 1 peer to 6 peers. Participants mentioned three of those peers as their boyfriend or girlfriend. Two participants included staff only, and both included two staff members. Three participants included both staff and peers. Two of those participants included one staff and one peer each, while the third participant included three peers and one staff.

At follow-up, 13 participants (38%) nominated 76 people who were either staff (33) or peer (43) at their residential treatment center. Peers included one cousin and one girlfriend. On average, staff or peers made up 32% of these participants' social convoys. Nine participants included only peers, ranging from 1 peer to 5 peers. One participant included three staff and no peers. The remaining participants had a mixture of staff and peers: 1 staff and 2 peers, 3 staff and 4 peers, 19 staff and 1 peer, and 7 staff and 15 peers. The participant who nominated 19 staff and 1 peer did not nominate any other members.

Member turnover. Participants in this study experienced varying levels of member turnover measured by the percentage of baseline members who were no longer members at follow-up. The mean turnover rate for the 35 participants with data at both baseline and follow-up was 49% (SD = 26, range 0 ~ 100), indicating that on average, participants did not nominate about half of the baseline members at follow-up. This turnover rate differed significantly by site, Wilcoxon Mann-Whitney test, $z = -2.414$, $p < .05$. Participants at Site A had significantly lower turnover rates (43%) compared to participants at Site B (70%). In addition, the number of prior out-of-home care placements was positively correlated with social convoy member turnover, Spearman's rho = .415, $p < .05$.

Tie strength. At baseline, the average tie strength was 2.27 (SD = 0.36, range 1.61~3.00; Table 5.1). All 38 participants had at least one member in the inner circle. Three participants did not have anyone in the middle circle, while 9 participants did not have anyone in the outer circle. On average, inner circle members made up 46% of the entire social convoy. Among those who had at least one person in the middle circle, middle circle members made up 38% of the social convoy. Finally, among those who had at least one person in the outer circle, outer circle members made up 25% of the social convoy.

The mean convoy-level tie strength at follow-up was 2.33 (SD = 0.42, range 1.67 ~ 3.00) and did not differ significantly from baseline. As was the case at baseline, all 34 participants at follow-up had at least one member in the inner circle. Seven participants did not have anyone in the middle circle, while 12 participants did not have anyone in the outer circle. Inner circle members made up more than half (52%) of the entire social convoy. For participants who had at least one member in the middle circle, middle circle members made up 38% of the entire social convoy. Outer circle members made up 27% of the social convoys of participants who had at least one member in the outer circle.

Network diversity.

Diversity of relationship roles. The mean baseline index of qualitative variation (IQV) score for diversity of relationship roles was .85 (SD = .18), indicating that the distribution of parents, siblings, extended family, non-family adults, and peers was quite even (Table 5.1). The mean IQV score at follow-up (.87, SD = .21) was not significantly different from baseline. No statistically significant correlation occurred between this IQV score and the proportion of kin at each time point, indicating the lack of a pattern of participants who had high proportion of kin in their social convoys scoring high or low on diversity of relationship roles.

Gender diversity. The mean IQV score for gender diversity at baseline was .90, indicating that overall the proportions of male and female members in the participants' social convoys were approximately equal (Table 5.1). At follow-up, the mean IQV score for gender diversity was .87 (SD = .24, range 0 ~1), which was not significantly different from the baseline IQV score. At baseline only, a statistically significant difference between participants in the two sites existed, Wilcoxon Mann-Whitney test, $z = 2.170$, $p < .05$. The mean IQV score for participants at Site A was .93 while the mean IQV score for participants at Site B was .78. Four

participants at Site B had gender IQV scores lower than .75. Further examination of data revealed that 75% to 86% of their social convoys consisted of female members.

Network density. At baseline, the mean density was .67 (SD = .27, range .14~1.00; Table 5.1). Eight participants (21%) had density scores of 1, which means that everyone in their social convoys knew one another. A statistically significant difference in mean density between the two sites occurred, Wilcoxon Mann-Whitney test, $z = 1.986$, $p < .05$. At Site A, the mean density was .72 (SD = .25) while the mean density for Site B participants was .49 (SD = .26), indicating that more people knew one another in the social convoys of children at Site A.

At follow-up, thirteen participants (38%) had density scores of 1. The mean density at follow-up was .73 (SD = .25, range .33 ~ 1.00) for the 33 participants who had at least two social convoy members to compute density. This did not significantly differ from the baseline mean density. However, for participants who had 4 or more out-of-home care placements prior to residential treatment, the mean density increased from .66 (SD = .27) at baseline to .80 (SD = .23) at follow-up.

Correlation among Structural Variables

Network composition and tie strength. The three concentric circles in the social convoy diagram represent the degree of closeness between the participant and the convoy members, which is the tie strength. Table 5.2 shows the association between tie strength and network composition by displaying the mean number and proportion of each relationship category for each of the three concentric circles. As shown in Figure 5.1, extended family members made up the largest proportion of the middle circle while peers made up the largest proportion of the outer circle at both time points. Over time, the proportion of kin (parents, siblings, and extended family combined) in the middle circle increased from 54% to 64%, Wilcoxon signed rank sum

test, z = -1.989, p < .05. Conversely, the proportion of peers in the middle circle decreased from 35% to 21%, z = 3.318, p < .001. The proportion of peers in the inner circle also decreased significantly from 14% to 6%, z = 2.293, p < .05.

Table 5.2.

Relationship category and closeness at baseline and at follow-up

	Baseline (N = 38)			Follow-up (N = 34)		
Frequency Mean (SD)	Inner circle [a]	Middle circle [b]	Outer circle [c]	Inner circle	Middle circle	Outer circle
Parents	1.13 (0.74)	0.37 (0.59)	0.26 (0.55)	1.18 (0.72)	0.35 (0.77)	0.09 (0.38)
Siblings	1.79 (1.82)	0.34 (0.75)	0.26 (0.55)	1.97 (2.07)	0.38 (0.70)	0.32 (1.09)
Extended family	1.79 (2.29)	2.21 (3.04)	0.63 (1.17)	1.32 (1.59)	1.82 (3.15)	0.50 (1.19)
Non-family adults	0.24 (0.59)	0.74 (1.64)	0.55 (1.06)	0.26 (1.05)	0.91 (2.31)	0.44 (1.46)
Peers	0.61 (1.52)	1.34 (1.74)	1.29 (2.42)	0.47 (1.38)	0.76 (1.58)	1.50 (3.35)
Percent Mean (SD)	Inner circle (N = 38)	Middle circle (N = 35)	Outer circle (N = 29)	Inner circle (N = 34)	Middle circle (N = 27)	Outer circle (N = 23)
Kin	83% (30)	54% (40)*	50% (43)	88% (27)	64% (41)	44% (47)
Parents	23% (17)	9% (15)	13% (28)	30% (28)	10% (18)	4% (15)
Siblings	31% (27)	8% (20)	10% (23)	31% (27)	16% (27)	11% (27)
Extended family	29% (28)	37% (36)	26% (38)	27% (29)	39% (41)	29% (45)
Non-family adults	3% (7)	11% (24)	17% (27)	6% (24)	15% (28)	14% (31)
Peers	14% (29)*	35% (38)***	33% (38)	6% (15)	21% (34)	42% (45)

Note. Statistical comparison is Wilcoxon signed rank sum test between baseline and follow-up.
[a] People who are "the most close and important" to participant. [b] People who are "not quite as close but who are still important" to participant. [c] People who are "not as close as the others, but who are still important" to participant.
* p < .05. *** p < .001

Relationship categories and member turnover. Participants with higher proportion of kin in their social convoys tended to have lower member turnover rates, Spearman's rho = -.381, p < .05. In addition, diversity of roles at baseline was negatively associated with the member turnover rate, Spearman's rho = -.417, p < .05. In other words, social convoys that contained relatively more equal proportions of different relationship categories at baseline tended to lose fewer members at follow-up.

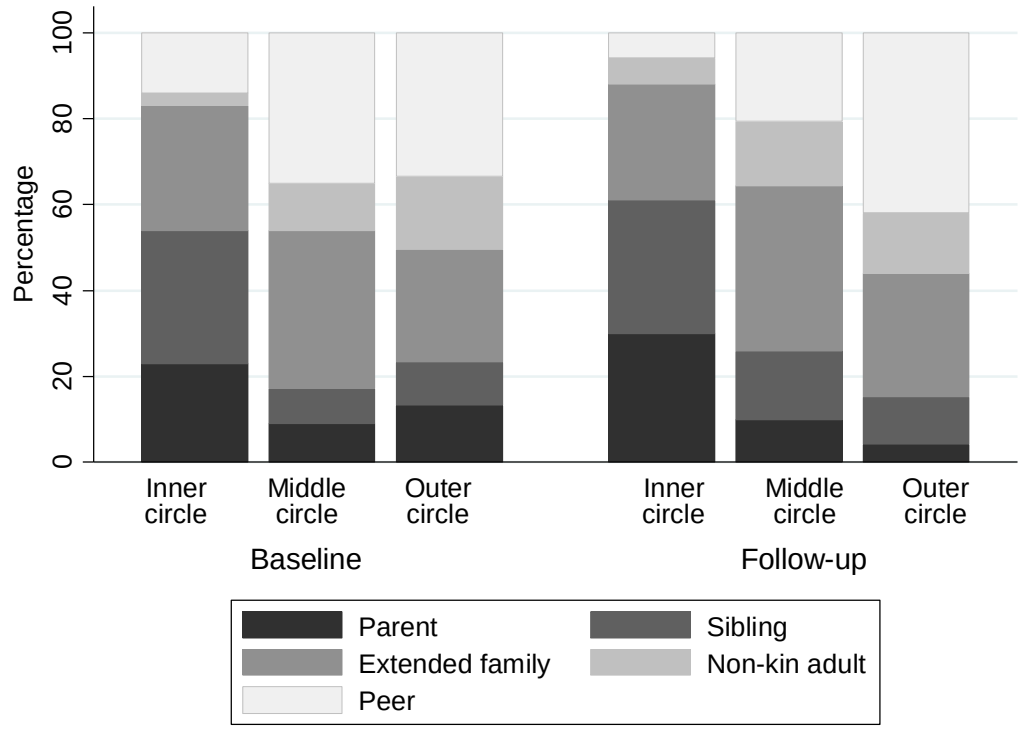


Figure 5.1. Relationship categories and closeness at baseline and at follow-up

Other structural variables. Table 5.3 presents the correlation matrix for all structural variables that have continuous values. The proportion of kin was strongly correlated with network density in the positive direction at both baseline and at follow-up, Spearman's rho = .704 and .651, $p < .01$. This was expected because density is the proportion of members who know one another, and kin members likely know one another. On the other hand, the proportion of peers negatively correlated with density at both baseline and at follow-up, Spearman's rho = -.612 and -.796, $p < .01$. This indicates that for participants who nominated more peers, fewer members of their social convoy knew each other. Another expected association was the negative correlation between proportion of female members and gender diversity within social convoys, Spearman's rho = -.439 at baseline and .458 at follow-up, $p < .01$.

Table 5.3.

Correlation among structural variables at baseline and at follow-up

Baseline (N = 38)	Size	% Kin	% Peer	% Female	Role diversity	Gender diversity	Density	Tie strength
Network size	1.000							
Proportion of kin	-.202	1.000						
Proportion of peers	.071	-.838	1.000					
Proportion of female	.045	-.087	-.168	1.000				
Role diversity	-.291	.165	-.099	.144	1.000			
Gender diversity	.207	.034	.088	-.439**	-.001	1.000		
Network density	-.247	.704**	-.612**	-.174	.272	-.028	1.000	
Average tie strength	-.308	.338*	-.308	.189	.346*	-.133	.344*	1.000
Follow-up (N = 33)[a]	Size	% Kin	% Peer	% Female	Role diversity	Gender diversity	Density	Tie strength
Network size	1.000							
Proportion of kin	-.412*	1.000						
Proportion of peers	.497*	-.777**	1.000					
Proportion of female	-.108	.316	-.125	1.000				
Role diversity	0.496**	.092	-.145	.166	1.000			
Gender diversity	.021	-.037	-.168	-.458**	.152	1.000		
Network density	-.429*	.651**	-.796**	-.060	.082	.063	1.000	
Average tie strength	-.431*	.265	.261	-.040	.267	.024	.440*	1.000

a One additional case that had only one social convoy member was dropped from analysis because of missing value on network density which requires at least two members.
* $p < .05$. ** $p < .01$.

A notable difference between baseline data and follow-up data was that network size correlated with five other structural variables at follow-up only. At follow-up, network size, density, and tie strength had a three-way correlation. First, network size negatively correlated with network density, Spearman's rho = -.429, $p < .05$, indicating that the larger the social convoy, the less its members knew each other. Network density in turn positively correlated with tie strength, Spearman's rho = .440, $p < .05$, while network size negatively correlated with tie strength, Spearman's rho = -.431, $p < .05$. In other words, small social convoys comprised of more people who know each other tended to have more people with strong ties to the participant. Network size also had a negative correlation with proportion of kin and a positive correlation

with diversity of roles, suggesting that at follow-up, smaller social convoys had a larger proportion of kin and fewer different relationship categories. On the other hand, larger social convoys tended to have higher proportion of peers.

Functional Properties of Social Convoys

The functional properties of social convoys included social support and negative interactions, measured by 8 binary-response items. Each social convoy member could provide up to 6 social support functions (2 affective support, 2 affirmation support, and 2 tangible aid) and 2 negative interaction functions. Adding all social support functions provided by all members of the social convoy produced the total amount of social support for each participant. This number does not take into account the participant's network size, so dividing the total amount of social support by the network size resulted in the average amount of social support by each social convoy member. Similarly, the total amount of negative interactions was the sum of all negative interactions by all members of the social convoy, while the average amount of negative interactions by each social convoy member was the total divided by the network size.

Social support. The mean total and average social support did not change significantly from baseline to follow-up (Table 5.4). However, for girls only, the mean total amount of social support decreased significantly over time, Wilcoxon signed rank sum test, $z = 2.105$, $p < .05$. At baseline, girls reported receiving close to 30 social support functions (mean = 29.75, SD = 29.56). At follow-up, girls received just over 20 social support functions (mean = 21.21, SD = 17.78) on average.

The only type of social support that showed a significant change from baseline to follow-up was tangible aid, which measured the degree to which members of the social convoy would help with school work and provide care if the participant got sick. The average amount of

tangible aid per social convoy member increased from 0.40 at baseline to 0.58, Wilcoxon signed rank sum test, $z = -2.112$, $p < .05$. Some subgroup differences existed in terms of change in average tangible aid over time. The mean average amount of tangible aid increased especially for participants 12 years of age or younger (0.40 to 0.63), those with more than 4 years of out-of-home care history (0.36 to 0.64), and those with more than 4 prior out-of-home care placements (0.42 to 0.73), $p < .05$.

Although the amounts of affective support and affirmation support did not significantly change over time for the entire group, they did for some subgroups. The mean average amount of affective support increased significantly for the oldest participants (13+), from 0.77 at baseline to 1.10 at follow-up, Wilcoxon signed rank sum test, $z = -2.387$, $p < .05$. The mean average amount of affirmation support increased over time for boys only (from 0.45 to 0.80), $z = -2.223$, $p < .05$.

Table 5.4.

Comparison of amount of social support at baseline and at follow-up

	Baseline (N = 38)			Follow-up (N = 34)		
	Mean (SD)	Median	Range	Mean (SD)	Median	Range
Total social support [a]	22.13 (21.70)	15.00	3 ~ 120	20.06 (16.23)	13.50	3 ~ 66
Affective support [b]	10.63 (9.76)	6.50	0 ~ 48	7.92 (7.89)	6.00	0 ~ 30
Affirmation support [c]	6.03 (7.63)	3.00	0 ~31	5.18 (6.51)	3.00	0 ~ 30
Tangible aid [d]	5.45 (8.19)	2.50	0 ~ 48	4.87 (5.45)	3.00	0 ~ 17
Average social support [e]	1.66 (1.08)	1.44	0.26 ~ 5	2.07 (1.45)	1.55	0.40 ~ 6
Affective support	0.80 (0.57)	0.67	0 ~ 2	0.89 (0.60)	0.67	0.12 ~2
Affirmation support	0.45 (0.43)	0.32	0 ~ 2	0.61 (0.60)	0.41	0 ~ 2
Tangible aid*	0.40 (0.41)	0.32	0 ~ 2	0.58 (0.49)	0.40	0 ~ 2

Note. Statistical comparison is Wilcoxon signed rank sum test between baseline and follow-up.
[a] Total amount of social support provided by all members of the social convoy. [b] Expressions of love and respect. [c] Validation of the appropriateness of the other person's actions or beliefs. [d] Provision of things, money, information, or time. [e] Average amount of social support by each member of the social convoy.
* $p < .05$

Negative interactions. The total and average amounts of negative interactions did not change significantly from baseline to follow-up. The baseline mean total amount of negative interactions was 2.39 (SD = 5.27, range 0 ~ 32) and the follow-up mean was 2.41 (SD = 4.81, range 0 ~ 27). The average amount of negative interactions with each social convoy member at was 0.18 (SD = .28, range 0~1.45) at baseline and 0.21 (SD = 0.28, range 0 ~ 1) at follow-up.

Correlation among Functional Variables

The average amount of social support by each social convoy member did not correlate with the average amount of negative interactions at either time point. The average amount of social support by each social convoy member significantly correlated with the amount of each specific type of social support at both time points. The strongest correlation was with affective support, Spearman's rho = .843 at baseline and .841 at follow-up, $p < .001$. The correlation between affective support and affirmation support was non-significant at baseline but moderate at follow-up, Spearman's rho = .474, $p < .01$. The correlations between affective support and tangible aid and between affirmation support and tangible aid were moderate at both baseline and follow-up (Spearman's rho = .414 ~ .604, $p < .05$).

Correlation between Structural and Functional Properties of Social Convoys

Network size and social support. Network size was negatively correlated with the average social support by each social convoy member at follow-up only, Spearman's rho = -.511, $p < .01$. This suggests that at follow-up, larger social convoys consisted of members who were not as supportive as those in smaller social convoys.

Network composition, tie strength, and social support. At both baseline and follow-up, social convoy members in the inner circle provided the largest proportion of social support. At baseline, 64% of an average participant's social support came from inner circle members (SD =

27), while 27 % of social support came from members in the middle circle (SD = 22). Outer circle members provided 9% of the participants' social support at baseline (SD = 13). These proportions did not change significantly at follow-up. The proportion of support coming from inner, middle, and outer circle members at follow-up were 61% (SD = 30), 29% (SD = 26), and 10% (SD = 16), respectively.

The next analysis examined social support provided by each relationship category in each of the three concentric circles of the social convoy (Table 5.5). These proportions indicate what percentage of the total social support each relationship category contributes within each circle as well as for the entire social convoy. For instance, data indicate that the proportion of parental support in the social convoy at baseline is 25%. This means that on average, 25% of the participants' social support came from parents. Parents provided 30% of all social support provided by the inner circle members at baseline.

Table 5.5.

Comparison of percentage of social support by each relationship category at baseline and at follow-up

	Baseline (N = 38)				Follow-up (N = 34)			
% (SD)	Inner circle [a]	Middle circle [b]	Outer circle [c]	Social convoy	Inner circle	Middle circle	Outer circle	Social convoy
Kin	79% (34)*	55% (43)	29% (45)	68% (32)	87% (29)	57% (46)	38% (49)	74% (31)
Parents	30% (22)	9% (21)	4% (15)	25% (21)	42% (34)	10% (21)	0	28% (23)
Siblings	28% (29)	11% (24)	17% (36)	19% (17)	20% (21)	12% (27)	11% (30)	19% (18)
Extended family	21% (26)	35% (38)	8% (26)	25% (23)	25% (31)	36% (43)	27% (46)	26% (26)
Non-family	4% (12)	10% (20)	15% (25)	7% (14)	6% (24)	16% (31)	9% (27)	9% (21)
Peers	16% (33)*	36% (40)*	55% (43)	24% (28)	7% (18)	27% (41)	53% (49)	18% (25)
Total [d]	99%	101%	99%	100%	100%	101%	100%	100%

[a] People who are "the most close and important" to participant. [b] People who are "not quite as close but who are still important" to participant. [c] People who are "not as close as the others, but who are still important" to participant. [d] Some proportions do not add up to 100% because of rounding.
* $p < .05$

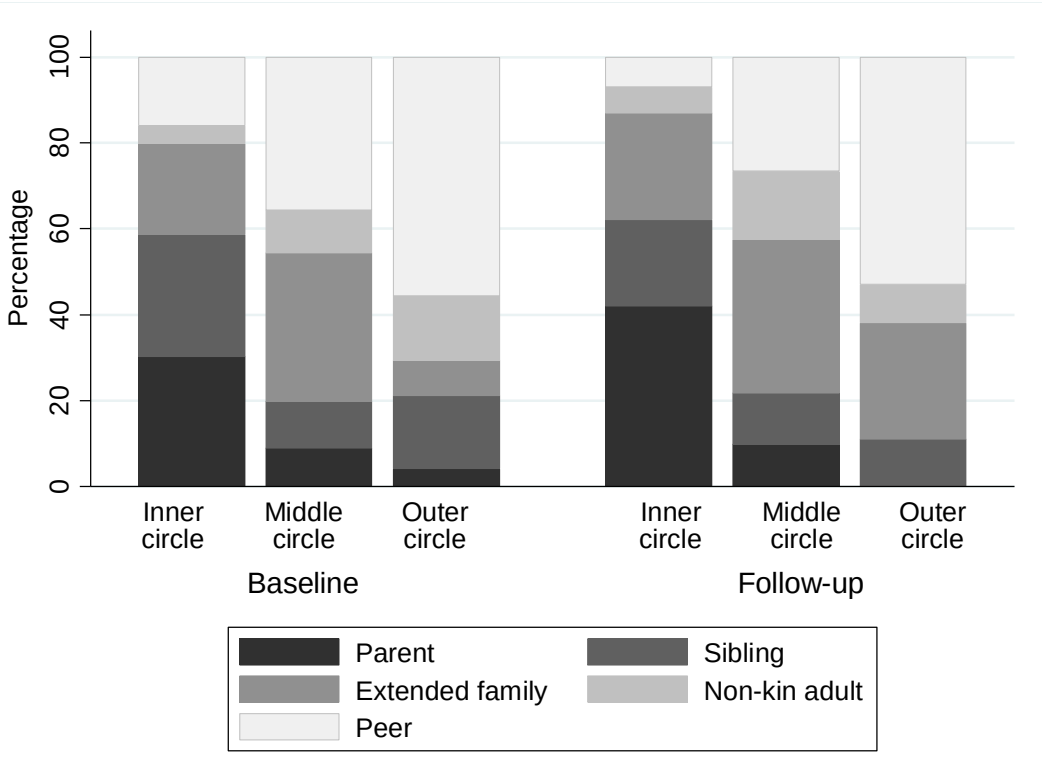


Figure 5.2. Percentage of social support by relationship category and tie strength

Table 5.5 and Figure 5.2 show that on average, parents and siblings provided the largest proportion of social support in the inner circle at both baseline and follow-up. In the middle circle, extended family and peers provided the largest proportion of social support, while peers provided over 50% of social support in the outer circle. Wilcoxon signed rank sum test revealed that the proportion of peer support in the inner and middle circles decreased significantly from baseline to follow-up. The proportion of peer support in the inner circle decreased from 16% at baseline to 7% at follow-up, $z = 2.491$, $p < .05$, while the proportion of peer support in the middle circle decreased from 36% to 27%, $z = 2.566$, $p < .05$. The proportion of kin support (parents, siblings, and extended family combined) in the inner circle increased from 79% at baseline to 87% at follow-up, $z = -2.155$, $p < .05$, but the proportion of kin support in other circles did not change over time.

Summary

During the first three to four months of residential treatment, participants' social convoys changed in a few ways. Structurally, changes occurred in the proportion of kin and proportion of peers in the social convoy, but only for girls. Girls' proportion of kin increased while their proportion of peers decreased over time. Age differences also emerged as the proportion of kin increased over time only for older participants. In addition, participants who experienced fewer types of child maltreatment had a significant increase in proportion of kin and a significant decrease in the proportion of peers, while the proportions remained the same for participants who experienced three or all four types of child maltreatment.

Examination of each concentric circle revealed that regardless of child maltreatment history, the proportion of peers in the inner and middle circles decreased over time. Consequently, the proportion of peer social support in the inner and middle circles decreased over time while the proportion of kin social support in the inner circle increased significantly. The amount of social support in the entire social convoy did not change significantly over time. However, the average amount of tangible aid – long-term care during illness and short-term help with school work – increased over time.

Chapter 6: Social Convoy Members

Research Question 2: How do relationships between social convoy members and foster children change during the first three months of residential treatment?

Relationship Categories

In total, the 38 participants at baseline identified 516 individuals as members of their social convoys. At follow-up, the 34 participants who nominated at least one social convoy member included a total of 418 members in their social convoys. These members had 24 different relationship roles, which fell into one of five main relationship categories: parents, siblings, extended family, non-family adults, and peers (Table 6.1). At baseline, there were 67 parents, 91 siblings, 176 extended family, 59 non-kin adults, and 123 peers. Social convoy members at follow-up included 55 parents, 91 siblings, 124 extended family, 55 non-kin adults, and 93 peers. Some participants mentioned pets, celebrities, and God, but this study excluded those members from analyses, because they were either not "close" or not "people".

Relationship categories and gender. At both baseline and follow-up, slightly more than half of the social convoy members were female (55% at baseline and 54% at follow-up). At baseline only, the proportion of female differed by relationship category, Chi^2 (4) = 14.499, $p < .01$. The proportion of female among non-family adults was 76% while the proportion of female for all other relationship categories was around 50%.

The next analysis used logistic regression to examine whether or not participant's gender related to the social convoy member's gender. Participants tended to include same-gender peers in their social convoys at both baseline (62%) and follow-up (69%). At baseline, boys' odds of nominating male friends were more than double the odds of girls nominating male friends (odds ratio = 2.635, log odds = 0.969, SE = 0.438, $p < .05$). At follow-up, the odds of nominating

same-gender peer was more than 4 times the odds of nominating peers of different gender (odds ratio = 4.855, log odds = 1.580, SE = 0.465, p = .001). For all other relationship categories, participants' gender did not relate to the social convoy members' gender.

Table 6.1.

Relationship categories at baseline and at follow-up

Category	Baseline	Follow-up	Category	Baseline	Follow-up
Parents	**67**	**55**	**Non-family adult**	**59**	**55**
Biological parents	54	47	Parent's unmarried partner	3	2
Stepparents	7	5	Teacher	6	3
Adoptive parents	6	3	Community service staff	4	3
			Current staff	7	31
Siblings	**91**	**91**	Former staff	8	7
Biological siblings	84	84	Foster parent	7	2
Stepsiblings	7	7	Neighbor	15	1
			CASA [a]	3	2
Extended family	**176**	**124**	Psychiatrist	2	0
Grandparents	39	24	Social Worker	4	4
Aunt/uncle	58	47			
Cousins	48	34	**Peers**	**123**	**93**
Niece/nephew	23	15	Friend	107	85
Great grandparents	5	3	Boyfriend/girlfriend	8	4
Sibling's spouse	3	1	Foster sibling	8	4
			Total	**516**	**418**

[a] Court-Appointed Special Advocate: volunteers who advocate for maltreated children in courts and communities.

Relationship categories and social convoy structure. At baseline, 41% of all social convoy members (N = 516) were in the inner circle, 37% in the middle circle, and 22% in the outer circle. At follow-up, 42% of all social convoy members (N = 418) were in the inner circle, 34% in the middle circle, and 23% in the outer circle. Table 6.2 presents the frequency of parents, siblings, extended family, non-family adults, and peers in each concentric circle. Multilevel mixed-effects ordered logistic regression analyses examined the conditional odds of a social convoy member being in a relatively "closer" relationship (i.e. inner circle versus middle and

outer circles, and inner and middle circles versus outer circle) compared to parents, given the random effects of the participant. At both baseline and follow-up, extended family, non-family adults, and peers were less likely to be in a closer relationship with the participant compared to parents. This difference did not change over time.

Table 6.2.

Closeness by relationship category at baseline and at follow-up

	Inner circle [a]	Middle circle [b]	Outer circle [c]	Social convoy
Baseline				
Parent	43 (64%)	14 (21%)	10 (15%)	67 (100%)
Sibling	68 (75%)	13 (14%)	10 (11%)	91 (100%)
Extended family*	68 (39%)	84 (48%)	24 (14%)	176 (100%)
Non-family adult***	10 (17%)	28 (47%)	21 (36%)	59 (100%)
Peer***	23 (19%)	51 (41%)	49 (40%)	123 (100%)
Total	212 (41%)	190 (37%)	114 (22%)	516 (100%)
Follow-up				
Parent	40 (73%)	12 (22%)	3 (5%)	55 (100%)
Sibling	67 (74%)	13 (14%)	11 (12%)	91 (100%)
Extended family***	45 (36%)	62 (50%)	17 (14%)	124 (100%)
Non-family adult***	9 (16%)	31 (56%)	15 (27%)	55 (100%)
Peer***	16 (17%)	26 (28%)	51 (55%)	93 (100%)
Total	177 (42%)	144 (34%)	97 (23%)	418 (100%)

Note. Statistical comparison is based on the estimate of the conditional (participant-specific) odds of belonging to a "closer" circle versus less close circles (e.g. inner circle > middle circle, outer circle) compared to parents using multilevel mixed-effects ordered logistic regression analysis.
[a] People who are "the most close and important" to participant. [b] People who are "not quite as close but who are still important" to participant. [c] People who are "not as close as the others, but who are still important" to participant.
* $p < .05$. *** $p < .001$

Membership Change over Time

Out of the 516 social convoy members at baseline, 235 members (46%) were not in the social convoys at follow-up (Table 6.3). Less than 20% of parents and siblings who were social convoy members at baseline became non-members at follow-up. On the other hand, the

percentages of extended family, non-family adults, and peers who became non-members at follow-up were 36%, 68%, and 83%, respectively. Based on random effects logistic regression analysis results, these percentages were significantly higher than the percentage of parents who became non-members at follow-up ($p < .001$). Four social convoy members who became non-members at follow-up were people who had passed away even before the baseline interview. In other words, some participants included deceased individuals at baseline but not at follow-up. These members included one mother, one grandfather, one boyfriend, and one friend. On the other hand, one grandmother, one uncle, and one set of great-grandparents who had passed away some time before the baseline interview remained in their social convoys at follow-up.

Table 6.3.

Membership change status by relationship category at baseline and at follow-up

Baseline	Remained at follow-up	Became non-members	Participant dropped out	Baseline total
Parents	50 (75%)	13 (19%)	4 (6%)	67 (100%)
Siblings	67 (74%)	17 (19%)	7 (8%)	91 (100%)
Extended family***	81 (46%)	63 (36%)	32 (18%)	176 (100%)
Non-family adults***	14 (24%)	40 (68%)	5 (8%)	59 (100%)
Peers***	19 (15%)	102 (83%)	2 (2%)	123 (100%)
Total	231 (45%)	235 (46%)	50 (10%)	516 (100%)
Follow-up	Members since baseline	New members at follow-up		Follow-up total
Parents	50 (91%)	5 (9%)		55 (100%)
Siblings**	67 (74%)	24 (26%)		91 (100%)
Extended family***	81 (65%)	43 (35%)		124 (100%)
Non-family adults***	14 (25%)	41 (75%)		55 (100%)
Peers***	19 (20%)	74 (80%)		93 (100%)
Total	231 (55%)	187 (45%)		418 (100%)

Note: Statistical test is based on the estimate of the conditional (participant-specific) odds of becoming a non-member or a new member compared to parents using random-effects logistic regression analysis.
** $p < .01$. *** $p < .001$.

Membership change among residential staff and peers. A high proportion of social relationships that participants made within the residential treatment center at the beginning of treatment did not remain after three months. Out of the 37 residential staff and peers who were social convoy members at baseline, 25 members (68%, 3 staff and 22 peers) became non-members at follow-up. Additional 4 members (11%, 3 staff and 1 peer) were no longer in social convoys at follow-up because they were originally in social convoys of participants who dropped out of the study. Eight members (22%, 1 staff and 7 peers) remained in their respective social convoys at follow-up. Of these members, 4 peers were not in the residential treatment center anymore at follow-up but still remained in the social convoy.

Tie strength and membership change. A random effects logistic regression analysis tested if an individual member's tie strength at baseline relates to the odds of becoming a non-member at follow-up. Each social convoy member received a tie strength score based on which concentric circle the member was in at each time point. Inner circle members received 3 points, while middle circle and outer circle members received 2 points and 1 point, respectively. Compared to social convoy members in the outer circle, the odds of becoming a non-member were 67% lower for members in the middle circle (log odds = -1.109, SE = 0.322, $p = .001$). Inner circle members had 93% lower odds of becoming a non-member compared to outer circle members (log odds = -2.624, SE = 0.351, $p < .001$).

Social support and membership change. The next set of analyses examined if a social convoy member's provision of social support at baseline relates to the odds of becoming a non-member at follow-up. Providing an additional social support function resulted in a 31% decrease in the odds of becoming a non-member (log odds = -0.375, SE = 0.087, $p < .001$). However, this effect became non-significant when the individual member's tie strength was added to the

random effects logistic regression model. When examining each social support function separately, four out of the six social support functions measured in this study were negatively associated with the odds of becoming a non-member (Table 6.4).

Table 6.4.

Random effects logistic regression of membership change on individual social support function from baseline to follow-up (N = 466)

	Log odds	SE	Odds ratio	p <
Affective support				
Likes to spend time with participant	-1.158	0.286	0.314	.001
Makes participant feel special	-1.343	0.295	0.261	.001
Affirmation support				
Participant talks to about important matters	-0.772	0.318	0.462	.05
Makes participant feel better	-0.204	0.291	0.816	n/s
Tangible aid				
Would take care of participant if sick	-0.713	0.301	0.490	.05
Helps participant with school work	-0.592	0.372	0.553	n/s

Note: SE = Standard error.

Visitation and membership change. Aside from social convoy members who were in the residential treatment center (i.e. residential staff and peers), a total of 40 members visited the participant at least once during the second or third months of treatment. These visitors included 16 parents (24% of all parents), 10 siblings (11% of all siblings), 8 extended family (5% of all extended family), and 6 non-family adults (12% of all non-family adults excluding staff). During the second and third months of treatment, these visitors visited less than 5 times on average (mean = 4.95, SD = 5.91, range 1 ~ 29). The number of visits did not differ by relationship category. Of the 40 members who ever visited, only 3 individuals (8%) became non-members at follow-up.

New Members at Follow-Up

Of the 418 social convoy members at follow-up, 187 individuals (45%) were new members who were not in the social convoys at baseline (Table 6.3). Compared to parents, all other relationship categories were significantly more likely to be new members at follow-up ($p < .01$). Less than half of the siblings (26%) and extended family members (35%) at follow-up were new members, while the majority of non-family adults (75%) and peers (80%) were new members.

New members from within the residential treatment center. Out of the 74 social convoy members who were either staff or peer at the residential treatment center at follow-up, 69 members (93%, 30 staff and 39 peers) were new members. Of the remaining 5 individuals who were social convoy members since baseline, one member was a cousin of the participant who came into the residential treatment center within the three-month period.

New members' tie strength. Of the 187 new members at follow-up, 41% were in the outer circle and 40% were in the middle circle. They made up 78% and 51% of outer and middle circles, respectively. On the other hand, only 20% of the new members were in the inner circle. A random effects ordered logistic regression confirmed that these differences were statistically significant. Compared to members that stayed in the social convoy since baseline, new members had 89% lower odds of being in a closer relationship with the participant (log odds = -2.167, SE = 0.248, $p < .001$).

New members' social support. The overall amount of social support at follow-up did not differ between new members and members who were in the social convoys since baseline. However, new members were less likely to provide two specific social support functions. The odds of being nominated as someone who likes to spend time with participant was 66% lower for

new members compared to original members (log odds = -1.071, SE = 0.270, $p < .001$). In addition, the new members' odds of being someone who would take care of participant when sick was 59% lower (log odds = -0.897, SE = 0.317, $p < .01$).

New members' visits. Seven individuals became new social convoy members at follow-up after having visited their respective participants during the second and third months of treatment. These members were 2 parents (of one participant) and 5 siblings (of 4 participants). They each visited 3 to 6 times during the second and third months of treatment.

Change in Tie Strength

Of the 231 social convoy members who were present at both baseline and follow-up, 156 (68%) remained in the same concentric circle. The tie strength score of 19% of this subsample increased at follow-up (i.e. member became closer to the participant), while the tie strength scores of about 13% of the social convoy members decreased. Overall, the tie strength scores of the 231 social convoy members who were present at both baseline and follow-up did not significantly change over time, and no difference in change in tie strength existed among the relationship categories.

Social Support

Total amount of social support. At baseline, an average social convoy member provided less than two social support functions (mean score 1.63, SD = 1.65) out of 6 possible. The mean number of social support functions provided by the social convoy members at follow-up was the same as the mean at baseline (mean = 1.63, SD = 1.73). The amount of social support provided to the participant varied by relationship category. Multilevel mixed effects linear regression analysis (Table 6.5, Model 1) indicated that at baseline, siblings provided about a half-point less social support than parents while extended family provided more than one fewer

social support functions than parents. Non-family adults and peers scored .69 and .71 points lower on social support compared to parents. This trend did not change significantly over time.

Table 6.5.

Multilevel mixed-effects linear regression of social support on relationship category over time (N = 934)

	Model 1		Model 2		Model 3	
Parameters	Estimate	SE	Estimate	SE	Estimate	SE
Fixed part						
Constant	2.399***	.218	-1.621	1.376	-1.703	1.346
Relationship category [a]						
Siblings	-.472*	.231	-.508*	.222	-.499*	.222
Extended family	-1.110***	.208	-.990***	.199	-.978***	.200
Non-family adults	-.690**	.262	-.373	.258	-.377	.258
Peers	-.712**	.226	-.364	.222	-.358	.223
Time	.285	.241	.184	.245	.188	.245
Relationship category*time						
Siblings	-.677	.311	-.609	.316	-.610	.316
Extended family	-.107	.290	.003	.293	-.002	.293
Non-family adults	-.544	.369	-.395	.367	-.386	.367
Peers	-.286	.313	-.068	.313	-.074	.314
Member-level covariates						
Male			-.369***	.094	-.366***	.094
Tie strength			.519***	.070	-.519***	.070
Convoy-level covariates						
Age			.241*	.112	.243*	.113
Male					.108	.271
Ethnicity [b]						
Latino					-.273	.289
Caucasian					.088	.392
Other/mixed					.552	.677
Number of placements					.017	.043
Years in out-of-home care					-.049	.039
Number of child maltreatment types					.090	.133
Random part						
Between-convoy variance	.632		.535		.481	
Between-member variance	.325		.060		.055	
Within-member variance	1.683		1.778		1.783	
Log likelihood	-1685.474		-1646.577		-1644.805	
BIC [c]	3459.862		3402.585		3446.918	

Note: SE = Standard error.

[a] Reference group is parents. [b] Reference group is African American.

[c] Bayesian Information Criterion = -2log likelihood + ln(*N*)k where *N* is the number of observations and k is the number of parameters estimated. The model with the smaller BIC is generally preferable (Rabe-Hesketh & Skrondal, 2012).

* p < .05. ** p < .01. *** p < .001.

Subsequent analysis included both member level and social convoy level (participant level) covariates: member's gender and tie strength score, and participant's age, gender, ethnicity, and out-of-home care history (Table 6.5, Models 2 and 3). Controlling for all other variables, siblings and extended family provided significantly fewer social support functions than did parents. Again no effect of time emerged. Male social convoy members provided fewer social support functions than female members, holding constant all other variables. Members' tie strength score positively related to the amount of social support. Older participants reported receiving more social support from their members compared to younger participants.

Types of social support by relationship category. The six social support functions consisted of two affective support, two affirmation support, and two tangible aid functions. Table 6.6 shows the percentages of social convoy members who provided each of the six social support functions at baseline and at follow-up. For each social support function, the researcher used multilevel mixed-effects logistic regression analysis to test if the relationship category was associated with whether or not the social convoy member provided the particular social support function. Subsequent analyses involved three separate multilevel mixed-effects linear regression analyses to examine the interaction effect of relationship category and time (baseline and follow-up) on affective support, affirmation support, and tangible aid. These analyses tested whether or not the effect of relationship category on the three types of social support changed over time.

Affective support. At baseline only, non-family adults were significantly less likely than parents to be someone who likes to spend time with participant. Both at baseline and at follow-up, siblings, extended family, and non-family adults were significantly less likely than parents to be someone who makes the participant feel special. Peers did not provide as much affective

support at baseline compared to parents, but this was not true at follow-up. Overall, the effect of relationship category on affective support did not change from baseline to follow-up.

Table 6.6.

Social support functions by relationship category at baseline and at follow-up

Baseline	Parents (n = 67)	Siblings (n = 91)	Extended family (n = 176)	Non-family adults (n = 58)	Peers (n = 123)
Affective support					
Likes to spend time with participant	54%	68%	41%	34%**	48%
Makes participant feel special	49%	34%*	23%***	24%***	28%**
Affirmation support					
Participant talks to about important matters	31%	24%	7%***	17%	15%
Makes participant feel better	34%	26%	20%**	38%	33%
Tangible aid					
Would take care of participant if sick	46%	22%***	16%***	45%	19%***
Helps participant with school work	24%	14%	7%***	19%	20%
Follow-up	Parents (n = 55)	Siblings (n = 91)	Extended family (n = 124)	Non-family adults (n = 55)	Peers (n = 93)
Affective support					
Likes to spend time with participant	47%	53%	43%	25%	41%
Makes participant feel special	47%	25%***	27%***	22%*	30%
Affirmation support					
Participant talks to about important matters	38%	19%**	20%***	13%*	15%**
Makes participant feel better	36%	24%*	27%	13%	32%
Tangible aid					
Would take care of participant if sick	69%	25%***	26%***	16%***	15%***
Helps participant with school work	33%	8%***	14%***	11%	23%

Note: Statistical comparison is based on the estimate of the conditional (participant-specific) odds of providing the social support function compared to parents using multilevel mixed-effects logistic regression analysis.
* p < .05. ** p < .01. *** p < .001.

Affirmation support. At baseline, extended family members were the only ones who were less likely to provide affirmation support compared to parents. At follow-up, however, siblings, non-family adults, and peers were also less likely than parents to be someone with whom the participant talks about important matters. Moreover, at follow-up, siblings were the

only ones who were less likely than parents to make participant feel better. The interaction effect of relationship category and time on affirmation support was not statistically significant.

Tangible aid. Non-family adults were just as likely as parents at baseline to be someone who would take care of participant during illness. However, at follow-up, non-family adults were significantly less likely than parents to provide the specific type of tangible aid. Siblings, extended family, and peers were less likely than parents to be someone who would take care of participant at both baseline and follow-up. In terms of helping participant with school work, extended family members were significantly less likely to provide such help compared to parents at both baseline and follow-up. At follow-up only, siblings were also less likely than parents to provide help with school work.

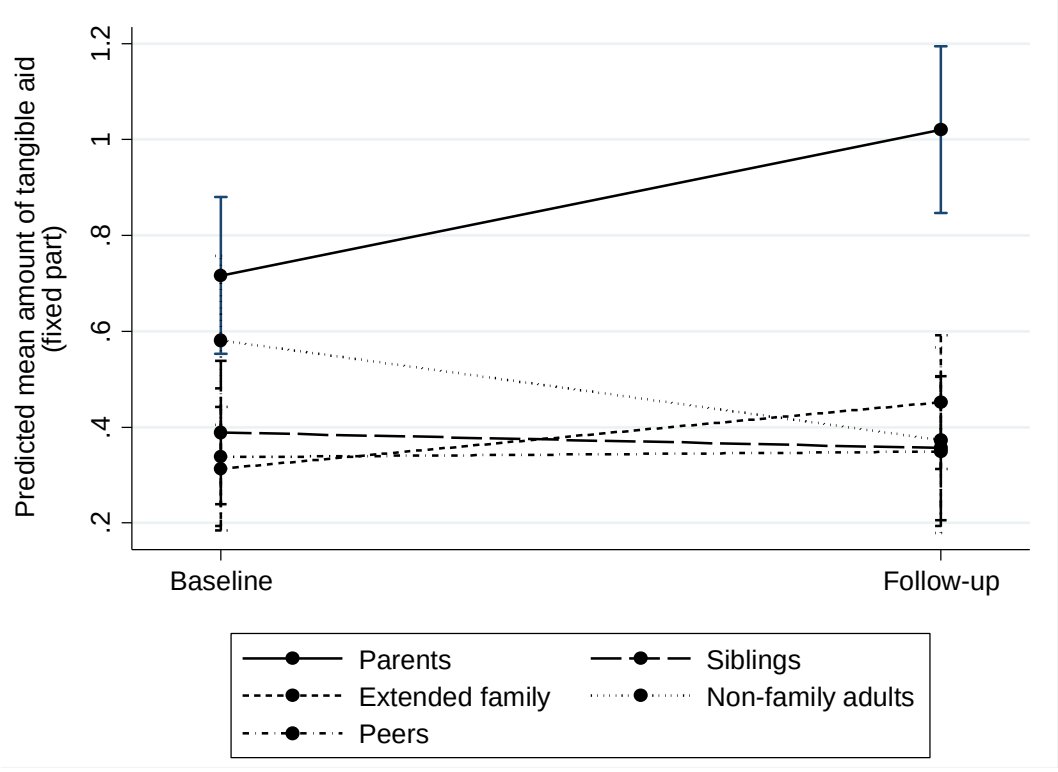


Figure 6.1. Adjusted predictions of tangible aid by relationship category and time

The overall effect of relationship category on tangible aid varied significantly by time. Figure 6.1 shows the predicted mean amount of tangible aid by each relationship category at baseline and at follow-up. Parents provided more tangible aid over time while non-family adults provided less tangible aid over time. The difference in the mean amount of tangible aid between parents and siblings, parents and non-family adults, and between parents and peers all significantly increased over time while the difference between parents and extended family did not.

Negative Interactions

Not many social convoy members engaged in negative interactions with the participants at both baseline and follow-up. At baseline (N = 516), participants named 51 members (10%) with whom the participant has conflict and 40 members (8%) who criticize them. Out of the 418 social convoy members at follow-up, 61 members (15%) were someone with whom the participant has conflict and 21 members (5%) were someone who criticizes the participant. Taking the two negative interaction items together, a significant interaction effect of relationship category and time emerged (Figure 6.2). Parents' negative interactions increased .18 points at follow-up (SE = .07, $p < .01$). Peers had .15 more negative interactions than parents at baseline (SE = .07, $p < .05$) but peers' negative interactions decreased about .12 points at follow-up (SE = .09, p = .001). Siblings' negative interactions also decreased slightly at follow-up (.03 points, SE = .09, $p < .05$).

Summary

Parents were most likely to be in the inner circle followed by siblings and extended family. Closer relationships were more stable over time and provided more social support compared to relationships that had relatively lower tie strength. Multilevel mixed-effect linear

regression analysis results indicated that siblings and extended family members provided fewer social support functions compared to parents at both baseline and follow-up. However, a significant interaction effect of relationship category and time on tangible aid existed. Parents and non-family adult members provided similar amounts of tangible aid at baseline, but at follow-up, parents' mean amount of tangible aid increased while non-family adult members provided fewer tangible aid functions.

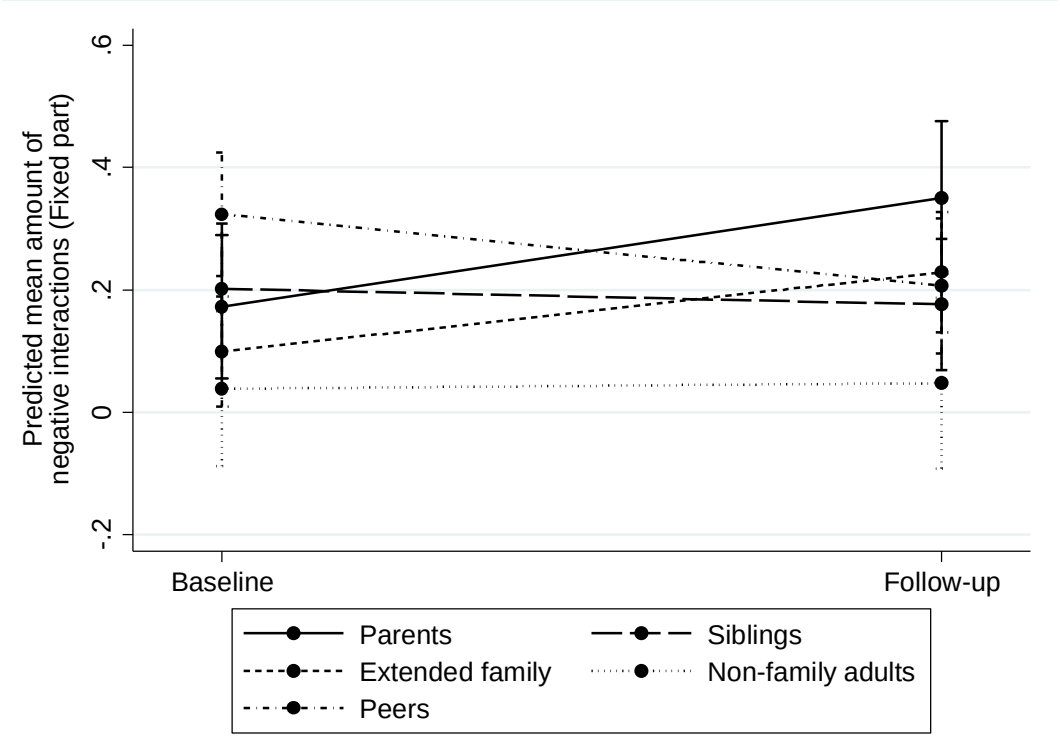


Figure 6.2. Adjusted predictions of negative interactions by relationship category and time

Chapter 7: Social Convoy Types

Research Question 3: Are there distinct types of social convoys among foster children in residential treatment centers?

Social Convoy Types at Baseline

Cluster analysis using network size, average tie strength, network density, average social support provided by each social convoy member, and the proportion of social support received from each relationship category resulted in four distinct types of social convoys at baseline. Table 7.1 displays the key features of the four clusters, and Table 7.2 presents the descriptive statistics of the social convoys by cluster at baseline.

Table 7.1. Social Convoy Types at Baseline (N = 38)

	Network size	Average tie strength	Network density	Average social support [a]	Sources of social support [b]	Average negative interactions [c]
1. Balanced-supportive (N = 11)	**Large**	Below sample mean	Below sample mean	**High**	Equal proportions	Below sample mean
2. Family-focused, more support functions (N = 11)	Below sample mean	Above sample mean	**Dense**	Above sample mean	96% kin	***Low***
3. Family focused, fewer support functions (N = 8)	***Small***	**Strong**	Above sample mean	***Low***	86% kin	At sample mean
4. Peer-focused (N = 8)	At sample mean	***Weak***	***Sparse***	Below sample mean	69% peers	**High**
Sample mean (range)	13.58 (3 ~ 36)	2.27 (1.61 ~ 3.00)	.67 (.17 ~ 1.00)	1.66 (0.26 ~ 5.00)	68% kin (18 ~ 100)	0.18 (0 ~ 1.45)

Note. Value labels such as large and small are relative to each other and to the sample mean. Precise descriptive statistics and the results for tests of comparison are presented in Table 7.2.
[a] Average amount of social support by each member of the social convoy. [b] Proportion of social support provided by different relationship categories. [c] Average amount of negative interactions by each member of the social convoy.

Table 7.2.

Social convoy characteristics by cluster at baseline (N = 38)

	1. Balanced-supportive (N = 11)	2. Family-focused, more support functions (N = 11)	3. Family-focused, fewer support functions (N = 8)	4. Peer-focused (N = 8)	p < [a]
Composition: Number of					
Parents	1.91 (0.83)	1.91 (0.70)	2.13 (1.25)	1.00 (0.76)	
Siblings	3.27 (127)	2.82 (1.33)	1.88 (3.44)	1.13 (0.64)	.01
Extended family	5.45 (5.01)	5.73 (4.22)	3.50 (2.20)	3.13 (3.31)	
Non-family adults	3.45 (2.84)	0.64 (1.43)	0.63 (1.77)	1.00 (1.07)	.01
Peers	3.91 (2.98)	0.64 (1.12)	1.50 (1.51)	7.63 (7.01)	.01
Network structure					
Network size	18.09 (8.87)	11.73 (5.06)	9.63 (6.25)	13.88 (9.03)	
Average tie strength	2.14 (0.24)	2.47 (0.41)	2.51 (0.23)	1.93 (0.19)	.01
Diversity of roles	.91 (.05)	.89 (.13)	.79 (.32)	.78 (.17)	
Diversity of gender	.87 (.13)	.93 (.07)	.95 (.05)	.86 (.18)	
Network density	.56 (.18)	.90 (.15)	.75 (.26)	.44 (.24)	.001
Network function					
Average social support	2.09 (1.21)	1.80 (1.29)	1.20 (0.63)	1.34 (0.78)	
Average negative interactions	0.13 (0.17)	0.05 (0.08)	0.18 (0.21)	0.42 (0.47)	.05
Total social support	38.64 (31.24)	18.91 (12.86)	9.50 (4.84)	16.50 (13.16)	.01
Total negative interactions	2.36 (2.54)	0.36 (0.50)	1.25 (0.71)	6.38 (10.51)	.01
Average social support by					
Parents	2.52 (1.49)	3.02 (1.60)	1.74 (1.14)	1.63 (1.85)	
Siblings	2.13 (1.31)	2.54 (1.08)	0	1.63 (1.92)	.01
Extended family	1.98 (1.34)	1.14 (1.67)	1.54 (1.00)	0.83 (2.09)	.05
Non-family adults	1.92 (1.50)	0	0.03 (0.07)	0.25 (0.27)	.001
Peers	1.64 (1.61)	0.32 (0.90)	0.50 (0.53)	2.04 (1.37)	.01
Average negative interactions by					
Parents	0.18 (0.25)	0.05 (0.15)	0	0.56 (0.73)	.05
Siblings	0.31 (0.64)	0.06 (0.16)	0.22 (0.39)	0.50 (0.76)	
Extended family	0.02 (0.05)	0.03 (0.10)	0.22 (0.27)	0.18 (0.35)	
Non-family adults	0.05 (0.18)	0	0	0	
Peers	0.22 (0.40)	0	0	0.37 (0.51)	.01
Total social support by					
Parents	4.45 (2.58)	5.55 (3.14)	4.38 (3.89)	1.88 (2.03)	
Siblings	6.91 (3.67)	7.27 (4.71)	0	2.00 (2.45)	.001
Extended family	8.82 (6.24)	5.45 (6.86)	4.00 (2.20)	1.38 (2.33)	.05
Non-family adults	8.91 (13.30)	0	0.13 (0.35)	0.50 (0.53)	.001
Peers	9.18 (13.21)	0.64 (1.80)	1.00 (1.20)	10.75 (8.28)	.001
Proportion of					
Parental support	14% (8)	35% (22)	39% (23)	10% (14)	.01
Sibling support	19% (9)	39% (12)	0	12% (14)	.001
Extended family support	25% (19)	23% (20)	47% (26)	4% (6)	.01
Non-family adult support	22% (19)	0	1% (3)	5% (6)	.001
Peer support	19% (14)	4% (9)	14% (19)	69% (18)	.001

[a] p values from Kruskal-Wallis test.

Participants in Cluster 1 (“balanced-supportive”) had large social convoys with members who provided above average social support. For these participants, social support came from all relationship categories almost equally. They had the largest total amount of social support (mean 38.64), and the largest number of non-family adult members (mean 3.45). Consequently, the proportion of non-family adult support for participants in this cluster was the highest (mean 22%).

Participants in Cluster 2 (“family-focused, more support functions”) had dense social convoys with parents and siblings who provided above average social support. Siblings provided nearly 40% of all social support for participants in this cluster, with an average 2.54 social support functions per sibling. The proportion of non-kin support for participants in this cluster was only 4%, which all came from the small number of peers (mean 0.64).

Participants in Cluster 3 (“family-focused, fewer support functions”) had small social convoys with strong ties (2.51). Although parents and extended family provided over 85% of social support for these participants, the social convoy members in this cluster were generally less supportive than members in Cluster 2. This group provided the least total amount of social support (mean 9.50). In contrast to the siblings in the family-focused, more support functions social convoys, siblings in the family-focused, fewer support functions social convoys provided no social support.

Finally, participants in Cluster 4 (“peer-focused”) had sparse, unsupportive social convoys composed of more peers than any other relationship categories. Peers provided nearly 70% of social support for participants who had peer-focused social convoys. At the same time, peers in this cluster engaged in more negative interactions compared to peers in other clusters. Participants in the four clusters did not differ in terms of gender, ethnicity, age, number of

previous placements, number of years in out-of-home care, number of child maltreatment types, and psychotropic medication use. Moreover, baseline clusters did not relate to whether or not the participant transferred to a Residentially Based Services (RBS) cottage during the following three months of study period.

Change in Social Convoy Properties over Time

In order to examine the stability of social convoy structure and function over time within each cluster, the researcher conducted multilevel mixed effects linear regression analysis. Figure 7.1 shows how standardized values of network size, average tie strength, network density, and average social support changed over time. Figure 7.2 presents the change in proportions of support provided by each relationship category from baseline to follow-up. Cluster 1 ("balanced-supportive") social convoys had about 53% (SD = 30) member turnover rate.[6] These social convoys showed significant changes in average tie strength, total amount of social support by all members, and average negative interaction with siblings. The average tie strength increased over time from 2.14 to 2.41 ($p < .05$). The total amount of support from all members decreased over time from 38.64 to 19.00 ($p < .01$). It seems that while members of Cluster 1 social convoys generally became closer to the participant, they provided fewer social support functions at follow-up. In addition, siblings in Cluster 1 social convoys engaged in fewer negative interactions at follow-up (.31) compared to baseline (.02) ($p < .05$).

[6] The percentage of social convoy members at baseline who became non-members at follow-up. For example, a 53% turnover rate means that 53% of all social convoy members at baseline were no longer members at follow-up.

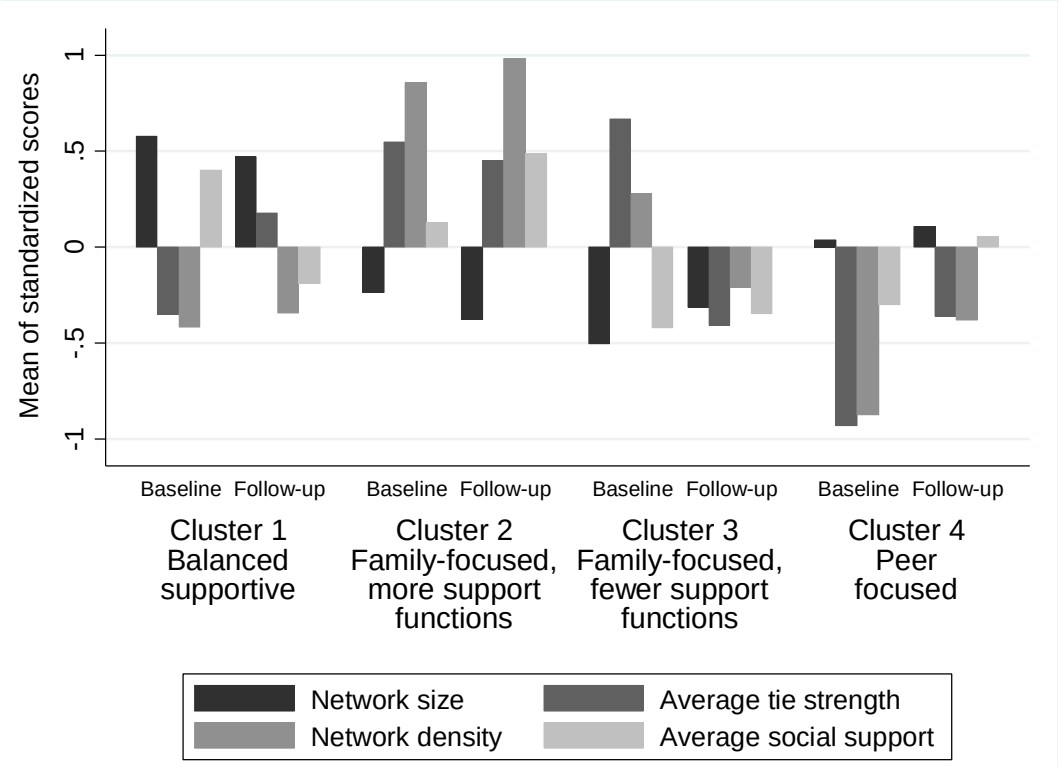


Figure 7.1. Social convoy clusters at baseline and at follow-up:

structural and functional properties

Cluster 2 ("family-focused, more support functions") social convoys' structural properties, such as network size, average tie strength, and network density, did not significantly change over time although the average member turnover rate was about 40% (SD = 25). However, some changes occurred in terms of the functional properties. The proportion of sibling support decreased significantly from 39% at baseline to 21% at follow-up ($p < .001$). Extended family members seem to have made up for the difference, but this increase in the proportion of extended family support was not statistically significant. Instead, the average negative interactions with extended family increased significantly from .03 at baseline to .20 at follow-up ($p < .01$).

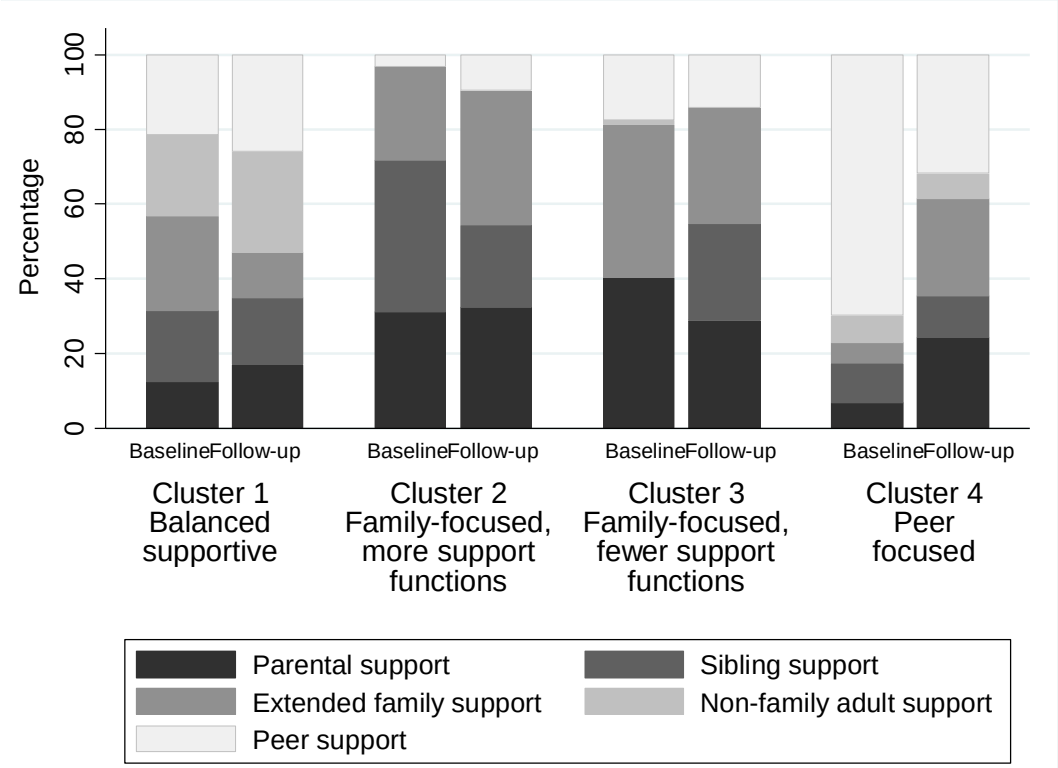


Figure 7.2. Social convoy clusters at baseline and at follow-up:

proportion of social support provided by each relationship category

The most notable change in Cluster 3 ("family-focused, fewer support functions") social convoys is the increase in the proportion of sibling support from 0% at baseline to 21% at follow-up ($p < .001$). However, the overall amount of social support for this cluster did not significantly change over time. The average negative interaction by extended family members decreased from .22 at baseline to .06 at follow-up ($p < .05$). Structurally, the average tie strength decreased significantly from 2.51 to 2.16 ($p < .001$), indicating that the social convoy members moved away from the inner circle. Slightly less than 40% of the baseline members became non-members at follow-up (mean = 38%, SD = 24).

The dominance of peer support in Cluster 4 ("peer-focused") social convoys decreased over time. The mean proportion of peer support in this cluster at follow-up was 31% compared to 69 % at baseline ($p < .001$). Consequently, the average negative interactions also decreased from .42 at baseline to .19 at follow-up ($p < .05$). On the other hand, the total amount of social support by all social convoy members increased from 16.50 at baseline to 23.25 at follow-up ($p < .001$). Overall, the peer-focused group still had higher proportion of peer support, but changed to a more supportive social convoy with family contribution. Due to the large number of peers in the social convoy, the peer-focused cluster had a 65% turnover in social convoy membership (SD = 14).

Examples of Social Convoy Types

Cluster 1: balanced-supportive. The balanced-supportive example shown in Figure 7.3 is the social convoy of a 12 year-old African American male participant who had a history of physical abuse and neglect. He had 10 foster care placements within 6 years prior to admission into the residential treatment center. During the study period, this participant attended 6th grade in the on-grounds non-public school. He transferred into a Residentially Based Services (RBS) cottage about two months after admission. His social convoy at baseline shows that he received approximately equal amounts of social support from both parents, three siblings, grandparents, one aunt, and three friends. According to administrative data, the participant had no other kin caregivers than his biological parents and had three siblings on record. Since the three friends did not know any of the family members, the overall network density was .56 at baseline, which was below the sample average of .67. This example is a typical social convoy in that immediate family members (parents and siblings) were in the inner circle, extended family members were in the middle circle, and non-kin members were in the outer circle. The average tie strength was

2.18 at baseline which was below the sample average of 2.27. However it increased to 3 at follow-up; all members at follow-up were in the inner circle. Out of the 35 remaining participants at follow-up, 6 participants (17%) had social convoys in which all members were in the inner circle.

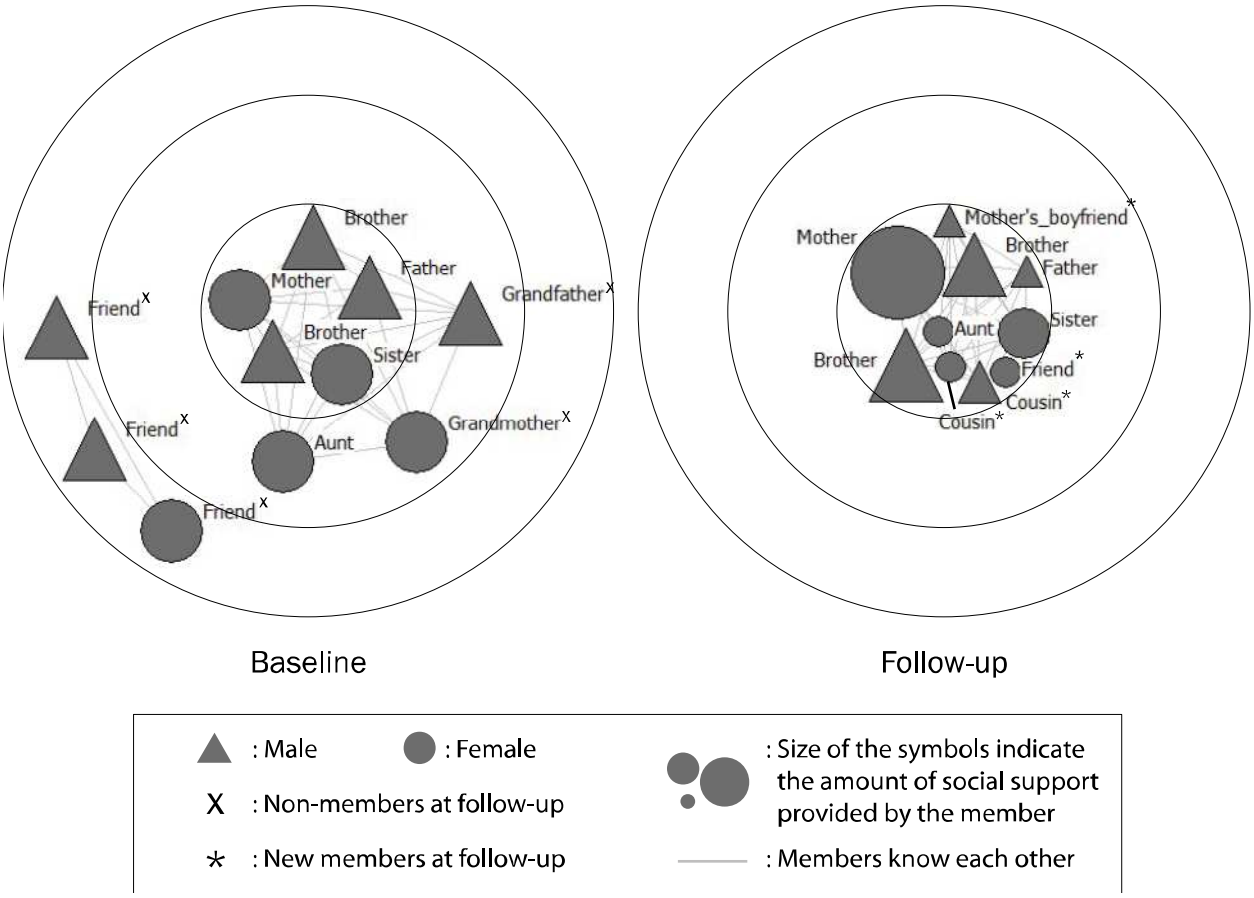


Figure 7.3. Example of Cluster 1 balanced-supportive social convoy

In this example, the participant's grandparents and three friends who were social convoy members at baseline were no longer members at follow-up. Instead, the participant added four new members at follow-up: mother's boyfriend, two cousins, and one friend. In other words, the structural stability of his social convoy was just over 50%. The three friends at baseline and the

new friend at follow-up were all peers in the same residential treatment center. In terms of social convoy function, the average amount of social support provided by each member of the social convoy decreased from 2 at baseline to 1.6 at follow-up. The proportion of social support provided by each relationship category changed greatly. The proportion of extended family support decreased from 27% at baseline to 6% at follow-up. On the other hand, parental social support increased from 18% at baseline to 38% at follow-up and siblings' contribution increased from 27% to 56%. With only one non-kin member in the social convoy, the participant did not receive any social support from non-kin at follow-up. The participant did not have any visits from his social convoy members other than the residential treatment peers.

Cluster 2: family-focused, more support functions. The family-focused, more support functions cluster example (Figure 7.4) is the social convoy of a 9 year-old African American male participant with a history of physical abuse and neglect. This participant had been in out-of-home care for 5 years prior to coming to the residential treatment center. The exact number of previous foster care placements is unknown. He moved into an RBS cottage between baseline and follow-up interviews. During the study period, the participant was in 3rd grade in a local public K-5 elementary school. At baseline, this particular social convoy was a tight circle of family members including parents (caregivers of record), two siblings, aunt (caregiver of record) and uncle, and one cousin. Due to having only kin members who knew each other in the social convoy, the network density at baseline was 1. The average tie strength was relatively high (2.43) as the outer circle contained no one. The participant's mother and two sisters were in the inner circle and provided the most amount of social support (44% and 33% of total amount of social support).

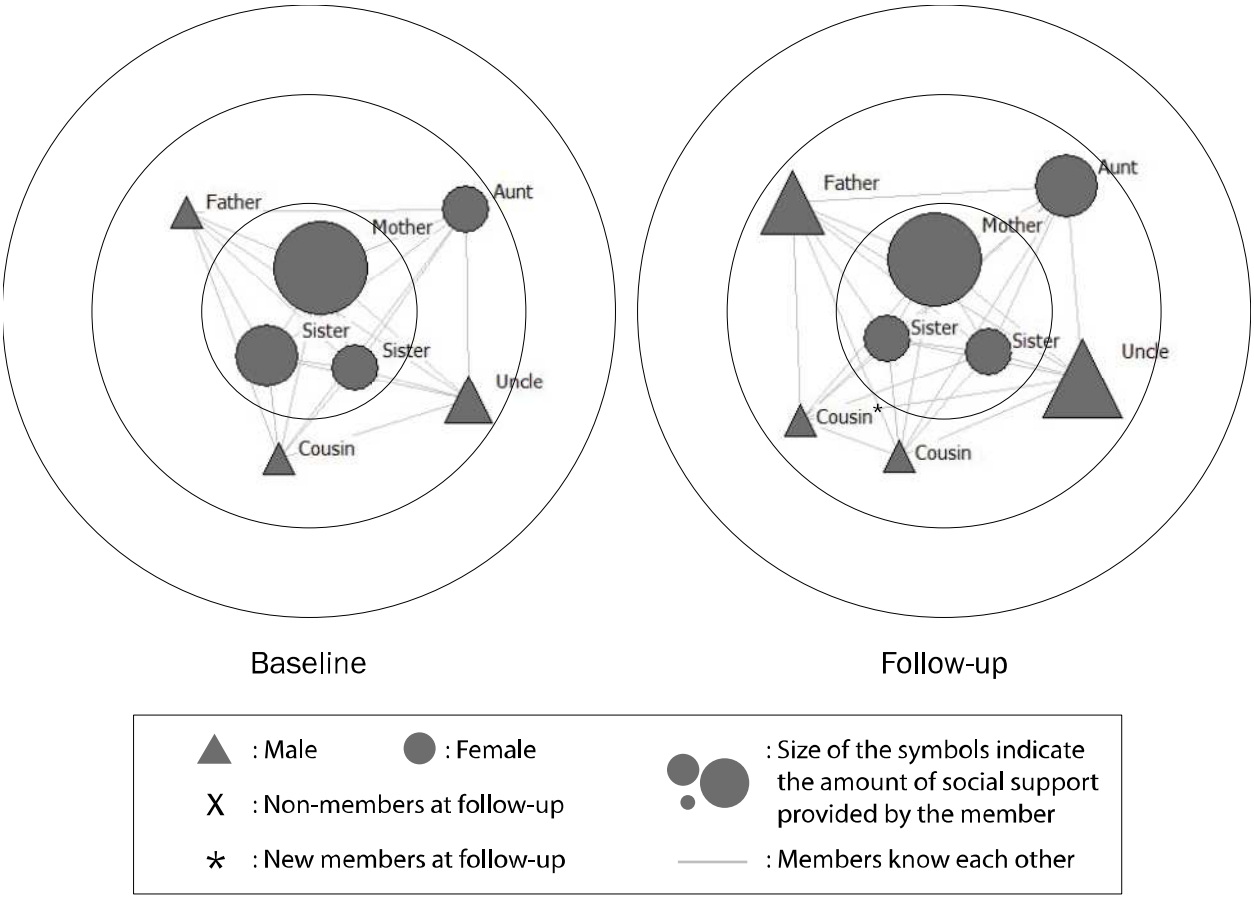


Figure 7.4. Example of Cluster 2 family-focused, more support functions social convoy

The social convoy structure was stable over time other than the addition of a cousin at follow-up. Functionally, some changes occurred although no one visited the participant. The participant's father, who was in the middle circle at both time points, provided an increased amount of social support at follow-up. The participant's father had not provided any social support at baseline. However, at follow-up, he was someone who made the participant feel better (affirmation support) and would take care of the participant if he became sick (tangible aid). While the two sisters' social support decreased, the participant's aunt and uncle became more supportive, especially in the domain of tangible aid. At the same time, the participant reported at follow-up that he had conflict with his uncle and two cousins. This increase in negative

interactions with extended family was one of the patterns noted for the family-focused, more support functions cluster.

Cluster 3: family-focused, fewer support functions. Figure 7.5 shows an example of the family-focused, fewer support functions cluster. This example is the social convoy of a 10 year-old Latino who had 3 foster care placements in 8 months preceding residential treatment. The participant had a history of emotional abuse, sexual abuse, and neglect. He attended 3rd grade in a local K-5 public elementary school during the study period. At baseline, this participant's social convoy members were all kin except for his girlfriend and friend. Administrative data indicated that the participant had numerous caregivers during his early life, including his biological parents, stepfather, and mother's boyfriend. However, he included only his biological parents in the social convoy. He had no siblings. The members of this social convoy were generally unsupportive. Each member except one aunt in the inner circle provided one social support function. However, the members were still relatively close to the participant, as 6 of the 10 members were in the inner circle and none were in the outer circle.

At follow-up, the social convoy changed greatly in terms of both structure and function. Half of the baseline members became non-members at follow-up. Among these individuals were the aunt who used to provide more social support than others at baseline. Six new members appeared at follow-up. All of these new members were peers who did not provide much social support. Two peers liked to spend time with the participant and one peer made the participant feel better. Five of the six new friends were from the residential treatment center. Four were in the outer circle. The only peer who was in the social convoy at both baseline and follow-up was the participant's girlfriend who became just a friend at follow-up. This peer was in the same residential treatment center at baseline but had discharged before follow-up. Overall, the average

tie strength of this participant's social convoy decreased from 2.60 at baseline to 2.00 at follow-up.

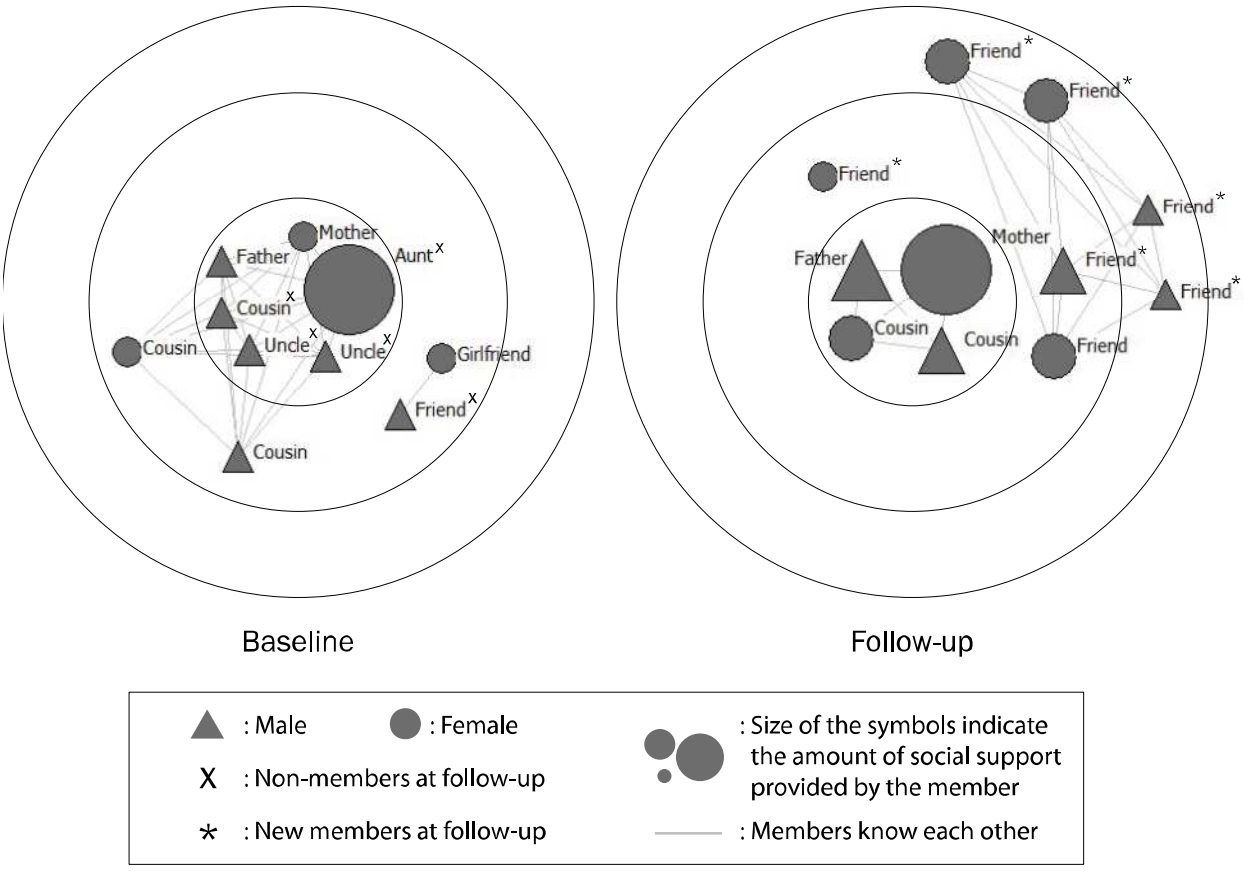


Figure 7.5. Example of Cluster 3 family-focused, fewer support functions social convoy

The participant's mother and father provided increased amounts of social support at follow-up. Both parents provided only one social support function at baseline. At follow-up, the participant's mother provided 4 social support functions (2 affective support and 2 tangible aid) and the father provided 2 social support functions (1 affective support and 1 tangible aid). Both became someone who would take care of the participant if he got sick. Particularly, the participant's mother visited the participant 9 times during the second and third months of

treatment. With this shift and the addition of more peers in the social convoy, the proportion of extended family support decreased from 64% at baseline to 17% at follow-up. At the same time, the average negative interaction by extended family members decreased as one cousin who used to have conflict with the participant at baseline no longer did. In addition, network density also decreased due to the peer network that was disconnected from the family in the inner circle. Network density at follow-up was .38, which was well below the sample mean of .67.

Cluster 4: peer-focused. The peer-focused social convoy example (Figure 7.6) is that of a 12 year-old Latina who had a history of physical abuse and neglect. She had 5 foster care placements in just 4 months of out-of-home care history. During the study period, she attended a local public middle school in the 7th grade. At baseline, this participant's social convoy included her mother, sister, uncle, boyfriend, and two friends. According to the administrative data, the participant also had a stepfather and two more siblings but did not include them in her social convoy. With 3 out of 6 members in the outer circle, the average tie strength at baseline was 1.83. Only peers (including boyfriend) provided any social support. However, all of these peers were no longer in the participant's social convoy at follow-up. Instead, the participant added two new friends at follow-up. One of these new friends was in the same residential treatment center. Although these peers were in the middle and outer circles, they still provided much social support – 70% all social support received.

The participant's mother stayed in the inner circle and provided two social support functions at follow-up (none at baseline). She had conflict with the participant at both baseline and follow-up. Another notable change is that the participant's sister who used to be in the outer circle at baseline moved to the inner circle. Moreover, the participant added two more sisters in the inner circle at follow-up. However, these sisters did not provide any social support. The sister

who was in the social convoy at both baseline and follow-up criticized the participant at both time points. The participant's mother and three sisters visited the participant 5 times during the second and third months of treatment. Taken together, this participant's social convoy remained peer-focused at follow-up but the proportion of peer social support decreased because of mother's increased social support. The average amount of social support by each social convoy member increased from 1 at baseline to 1.5 at follow-up.

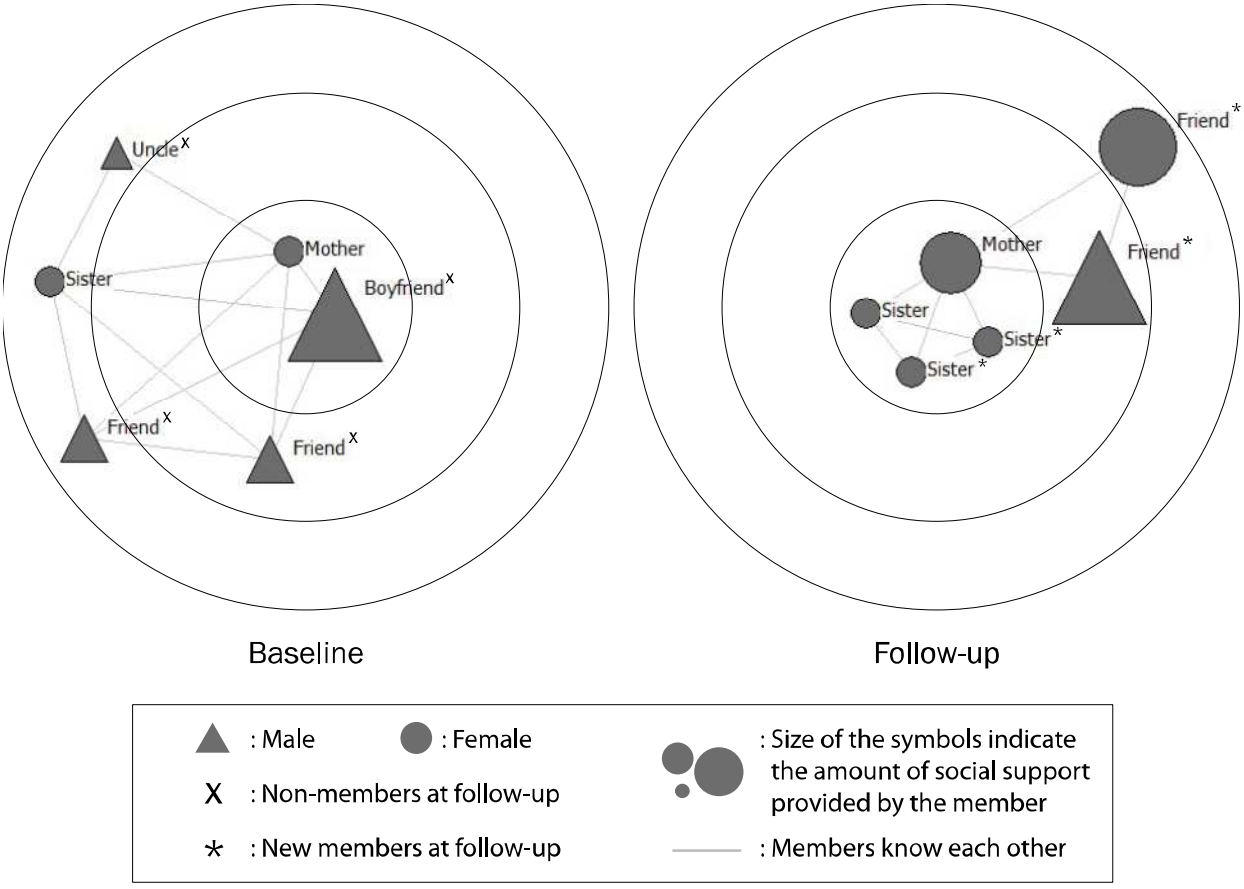


Figure 7.6. Example of Cluster 4 peer-focused social convoy

Summary

At baseline, four distinct types of social convoys emerged as a result of cluster analysis: balanced-supportive, family-focused more support functions, family-focused fewer support functions, and peer-focused. Changes in the structural and functional properties of these types over time made it difficult to classify the social convoys into the same clusters at follow-up. Participants with balanced-supportive social convoy at baseline generally received less social support at follow-up. Family-focused, more support functions social convoys remained similar in terms of structure, but participants in this cluster had more negative interactions with extended family. On the other hand, negative interactions with extended family decreased and sibling support increased for family-focused, fewer support functions social convoys. Peer-focused social convoys became less dependent on peer social support at follow-up but still remained peer-focused.

Chapter 8: Social Convoy Types and Behavioral Problems

Research Question 4: how do foster children's social convoys relate to their behavioral problems during the first three months of residential treatment?

Behavioral Problems among Participants

Baseline. At baseline, the mean Youth Outcome Questionnaire 30 (Y-OQ-30) score for all 38 participants was 41.97 (SD = 21.65, range 2~91). No statistically significant difference in total Y-OQ-30 scores existed between participants in Site A and participants in Site B. The mean Y-OQ-30 score for this sample is similar to the mean parent-reported score of 43.3 for the outpatient normative sample (Burlingame et al., 2004). For Y-OQ-30, the cut-off score that distinguishes the clinical sample from the community sample is 29 (Burlingame et al., 2004). Out of the 38 participants, 9 participants (24%) scored below the cut-off score indicating that their level of behavioral problems was within the range of youth who do not generally need behavioral health services. Three participants (8%) scored above 68.1, which is the mean score of the inpatient normative sample (Burlingame et al., 2004).

A significant gender difference emerged in Y-OQ-30 scores at baseline. Contrary to the normative sample, girls in this study had more behavioral problems than boys shortly after entering residential treatment. Girls in this study had higher scores than boys on the Aggression, Conduct Problems, Hyperactivity, and Depression/Anxiety subscales. Table 8.1 contains the comparisons between boys and girls and between the study sample and the normative sample. Boys in the study sample scored lower on the Somatic and Hyperactivity subscales compared to boys in the normative sample. Consequently, boys in the study sample had lower total Y-OQ-30 scores than boys in the normative sample. Girls in the study sample scored lower on the Somatic subscale but significantly higher on the Aggression and Conduct Problems subscales compared

to girls in the normative sample, which brought up their total Y-OQ-30 score above the normative sample's mean.

Following the Y-OQ-30 manual, participants fell into two age groups: one group consisting of children younger than 12 years of age and the other group consisting of children 12 years old or older. No statistically significant age group difference in total Y-OQ scores or in each of the subscale scores appeared. Furthermore, the study sample's scores did not differ from the outpatient normative sample's scores when age was factored in.

Table 8.1.

Comparison of Youth Outcome Questionnaire 30 (Y-OQ-30) scores at baseline

	Study Sample		Normative Sample (Outpatient)[a]	
	Boys (N=22)	Girls (N=16) [b]	Boys (N=3368) [c]	Girls (N=1764) [d]
Somatic	1.41 (1.65)	1.88 (2.03)	3.95 (2.32)*	4.49 (2.52)*
Social Isolation	1.73 (1.70)	2.25 (1.84)	2.51 (2.32)	2.51 (2.10)
Aggression	3.32 (2.59)	6.25 (3.59)*	3.24 (2.90)	2.41 (2.52)*
Conduct Problems	8.50 (5.15)	13.69 (6.13)*	9.84 (5.22)	8.16 (5.46)*
Hyperactivity/Distractibility	4.18 (2.44)	6.63 (2.58)*	7.21 (2.90)*	5.84 (3.36)
Depression/Anxiety	6.64 (4.35)	9.63 (3.77)*	7.66 (4.64)	8.16 (4.62)
Total score	33.36 (19.00)	53.81 (19.82)*	44.01 (18.57)*	40.90 (18.48)*

[a] Summary statistics from Burlingame et al. (2004). [b] Statistical comparison is against boys in the study sample. [c] Statistical comparison is against boys in the study sample. [d] Statistical comparison is against girls in the study sample.
* $p < .05$

Change in behavioral problems over time. The mean YO-Q-30 score for the 35 participants who remained at follow-up was 50.60 (SD = 20.89, range 1 ~ 89). This mean score was significantly higher than the baseline mean, Wilcoxon signed rank sum test, $z = -2.343$, $p < .05$. The higher mean score indicates that the participants' behavioral problems worsened during the first three months of residential treatment. This increase in behavioral problems was

especially salient in the domain of physical aggression. The mean score on the Aggression subscale increased significantly from 4.55 (SD = 3.34) at baseline to 5.31 (SD = 3.00) at follow-up, Wilcoxon signed rank sum test, $z = -2.426$, $p < .05$.

The mean change in the YO-Q-30 scores from baseline to follow-up was 10.29 (SD = 23.55, range -30 ~ 82). The behavioral change over time did not relate to the participants' demographic characteristics or out-of-home care history. Moreover, the change in YO-Q-30 score did not differ by site or by psychotropic medication use. No difference between participants who moved to a Residentially Based Services (RBS) cottage and those who did not emerged. The participant who improved the most scored 74 at baseline and 44 at follow-up. The participant who had the largest increase in behavioral problems scored 7 at baseline and 89 at follow-up. Using the reliable change index (RCI) of 10 (Burlingame et al., 2004), 6 participants (17%) showed significant improvement (i.e. fewer behavioral problems) while 16 (46%) showed significant deterioration. The remaining 13 participants (37%) showed no reliable change in YO-Q-30 scores from baseline to follow-up.

Following a more specific outcome classification by Nelson, Warren, Gleave, and Burlingame (2013), the researcher used both the RCI and the clinical cut-off score of 29 to further categorize the participants. One participant significantly deteriorated but remained within the normal range of behavioral problems. Of the 6 participants who significantly improved, 2 participants remained within the clinical range of behavioral problems. Thus, 4 participants clinically improved, showing significant improvement *and* falling within the normal range of behavioral problems at follow-up.

Social Convoy Types and Behavioral Problems

Baseline. At baseline, the total Y-OQ-30 scores did not differ by social convoy cluster (Table 8.2). Statistically significant difference among clusters emerged only for the hyperactivity subscale, Kruskal-Wallis test, $p < .05$. The hyperactivity subscale contains three items and the possible range of scores is 0 to 12. Participants in Cluster 4 ("peer-focused") had the highest mean hyperactivity score (mean = 7.00, range 5 ~ 11), while participants in Cluster 2 ("family-focused, more support functions") had the lowest mean hyperactivity score (mean = 3.27, range 0 ~ 9).

Table 8.2.

Youth Outcome Questionnaire 30 (Y-OQ-30) scores by social convoy cluster at baseline

Score at baseline	Maximum possible	1. Balanced-supportive (N = 11)	2. Family-focused, more support functions (N = 11)	3. Family-focused, fewer support functions (N = 8)	4. Peer-focused (N = 8)
Somatic	12	2.36 (2.01)	0.73 (1.01)	2.25 (2.31)	1.13 (1.36)
Social Isolation	8	2.36 (1.91)	1.18 (1.54)	2.50 (1.85)	1.88 (1.64)
Aggression	12	4.18 (2.93)	4.09 (3.99)	3.25 (3.41)	7.00 (1.77)
Conduct Problems	24	10.55 (4.89)	8.27 (7.17)	9.50 (5.07)	15.38 (5.15)
Hyperactivity/Distractibility*	12	6.09 (1.92)	3.27 (3.07)	4.88 (2.30)	7.00 (2.27)
Depression/Anxiety	24	8.64 (3.14)	5.27 (4.86)	9.13 (4.52)	9.25 (3.92)
Total score	120	44.36 (15.14)	30.09 (25.80)	40.50 (21.73)	56.50 (15.87)

Note: p values from Kruskal-Wallis test.
* $p < .05$

Social convoy types and behavioral problems over time. The change in YO-Q-30 scores from baseline to follow-up differed significantly by cluster, Kruskal-Wallis test, $p < .05$ (Table 8.3). As a group, participants with the family-focused, more support functions social convoys deteriorated the most with the mean change in YO-Q-30 scores of 31.11 (SD = 27.14). On the other hand, the mean difference in YO-Q-30 scores for the family-focused, fewer support

functions cluster was -8.00 (SD = 18.55), indicating that this group generally improved their behaviors. As for specific subscales, the clusters significantly differed in terms of change in conduct problems and depression/anxiety, Kruskal-Wallis test, $p < .05$.

Table 8.3.

Change in Youth Outcome Questionnaire 30 (Y-OQ-30) scores by social convoy cluster

Change in score	1. Balanced-supportive (N = 11)	2. Family-focused, more support functions (N = 9)	3. Family-focused, fewer support functions (N = 8)	4. Peer-focused (N = 7)
Somatic	0.46 (2.88)	1.11 (2.32)	-1.38 (2.13)	0.71 (1.50)
Social Isolation	0.64 (2.11)	1.56 (1.33)	-1.25 (2.55)	0.86 (2.04)
Aggression	1.09 (1.64)	2.67 (4.03)	0.13 (2.80)	0.57 (1.99)
Conduct Problems*	2.91 (4.57)	8.22 (8.04)	-1.00 (5.93)	-0.71 (5.77)
Hyperactivity/Distractibility	0.73 (3.13)	3.33 (2.65)	-0.50 (3.25)	0.14 (2.34)
Depression/Anxiety*	1.27 (3.93)	5.44 (5.92)	-3.13 (3.98)	2.29 (4.89)
Total change*	10.91 (13.40)	31.11 (27.15)	-8.00 (18.55)	3.43 (17.49)

Note: p values from Kruskal-Wallis test.
* $p < .05$

As shown in Figure 8.1, three participants in the family-focused, fewer support functions cluster scored above the clinical cut-off at baseline but showed clinical improvement (i.e. showed improvement of more than 10 points *and* scored below the clinical cut-off) at follow-up. On the other hand, five participants in the family-focused, more support functions cluster scored below the clinical cut-off at baseline but clinically deteriorated at follow-up. The following sections illustrate examples of clinical improvement and clinical deterioration.

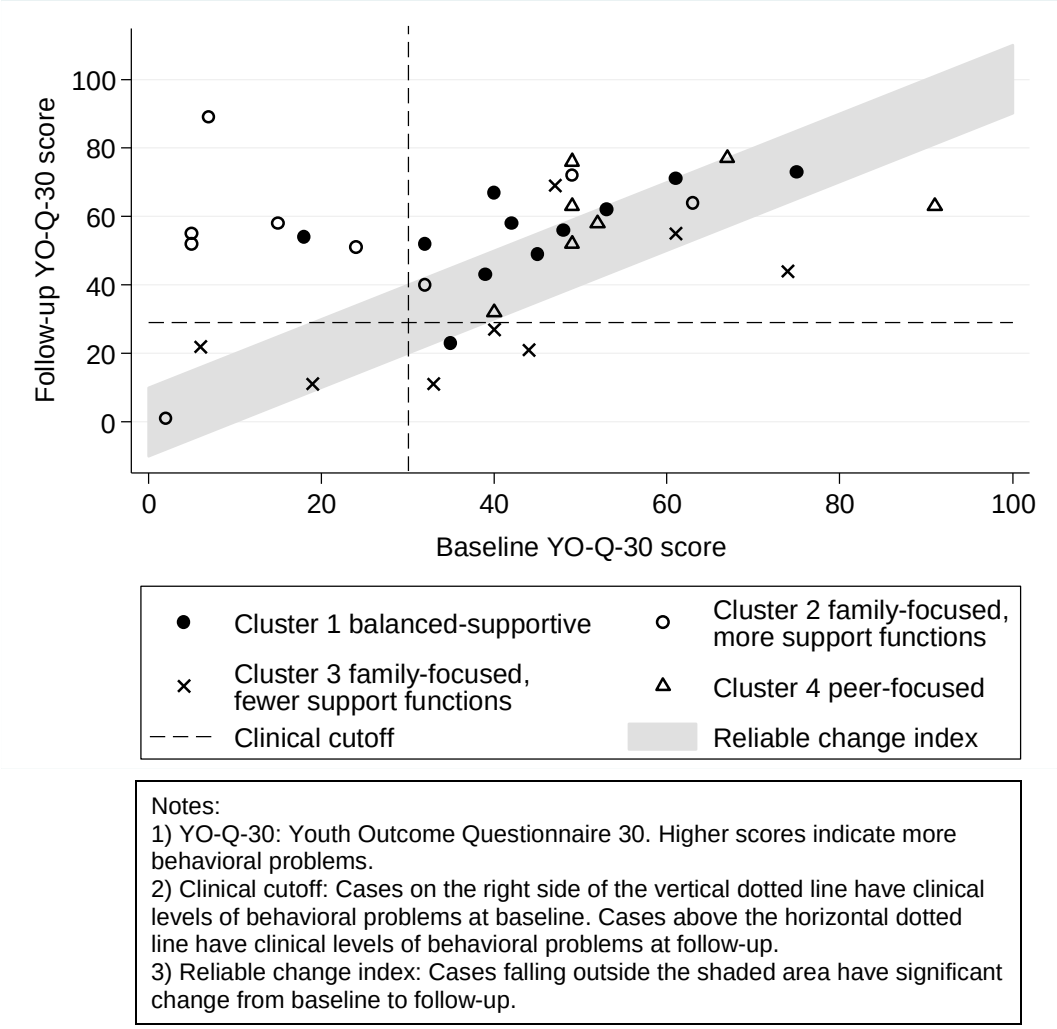


Figure 8.1. Scatterplot of behavioral problem scores at baseline and at follow-up by cluster

Clinical improvement example. Among those who showed clinical improvement, the participant who showed the most improvement in behavioral problems was a 12 year-old bi-racial boy in 7th grade at a local public middle school. After entering the out-of-home care system soon after birth, he had 6 different foster care placements prior to residential treatment. The participant's parental figure during early years was his grandmother who passed away before the study period. Administrative data indicated that he did not experience the types of child maltreatment specified in this study, but had witnessed a murder. During the study period,

the participant was on psychotropic medication to help with treatment. The participant's Y-OQ-30 score decreased from 44 at baseline to 21 at follow-up.

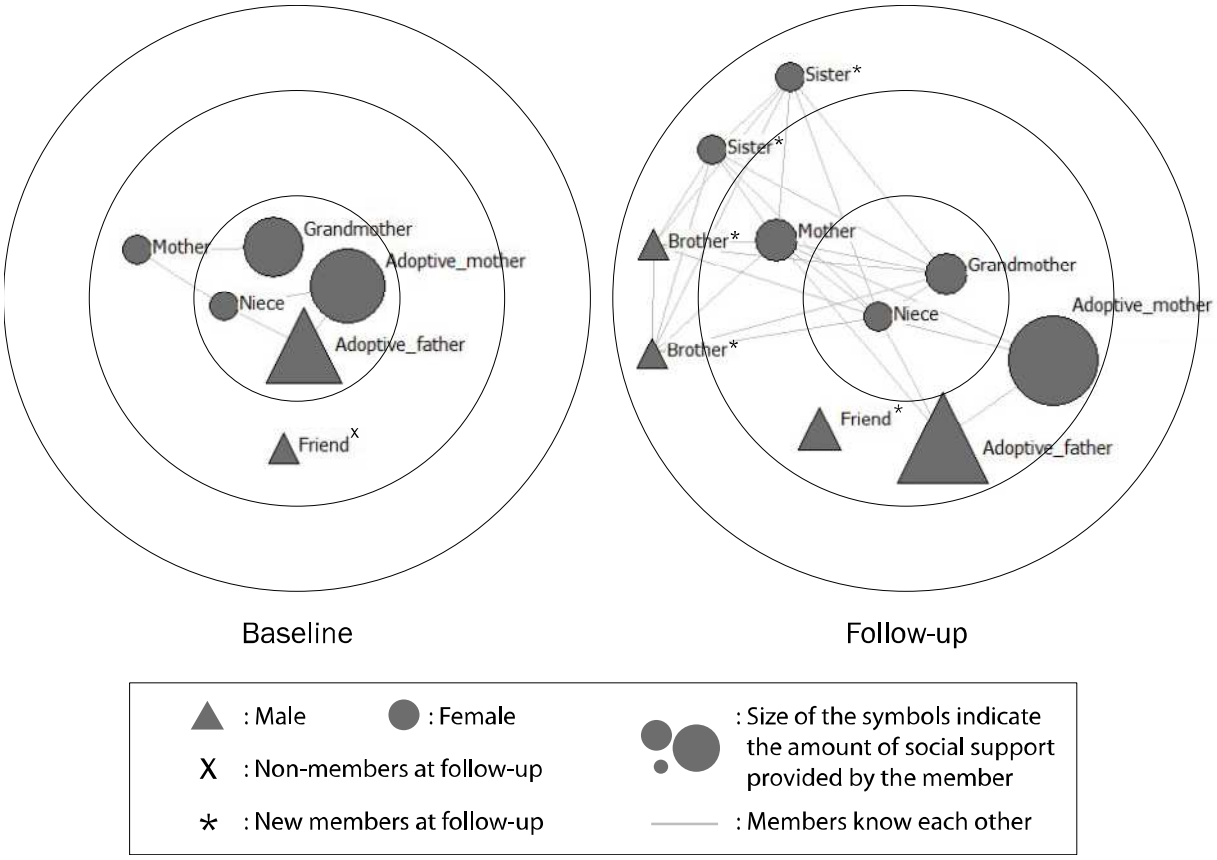


Figure 8.2. Example of clinical improvement (family-focused, fewer support functions)

At baseline, this participant's social convoy showed the family-focused, fewer support functions pattern (Figure 8.2). It was a small social convoy with 6 members, 5 of whom were kin. However, network density was lower than expected (.40) because the social convoy included two adoptive parents who knew only one of the other kin members. The average tie strength was quite high at 2.67 with four of the six members in the inner circle. Inner circle

members included the participant's grandmother (who had passed away), adoptive parents, and niece. The participant included his biological mother and a friend in the middle circle and no one in the outer circle. Most of the participant's social support came from his adoptive parents (4 functions each) and grandmother (3 functions). On the other hand, the participant's mother and niece provided one social support function each.

At follow-up, the participant replaced his friend in the middle circle with another friend. Moreover, he added 4 of his siblings (5 on record) in the outer circle which brought the average tie strength down to 1.8. While his deceased grandmother remained in the inner circle, the participant's perception of the amount of social support from grandmother decreased at follow-up. On the other hand, his adoptive parents' social support increased although their position in the social convoy moved farther away from the participant. The participant's adoptive parents traveled from a different state to visit him once during the study period. At follow-up, the adoptive parents provided all six social support functions. Together with the increased network size, the participant received an increased amount of social support at follow-up compared to baseline.

Clinical deterioration example. The participant who showed the most deterioration in behavioral problem was a 12 year-old Latina in 6th grade at a public middle school. She had experienced physical abuse and neglect, and had been in 7 different foster care placements in 3 years prior to residential treatment. Administrative data showed that adults who lived with the participant earlier included both of her biological parents and her mother's boyfriend. During the study period, the participant's Y-OQ-30 score increased from 7 at baseline to 89 at follow-up. She was on psychotropic medication.

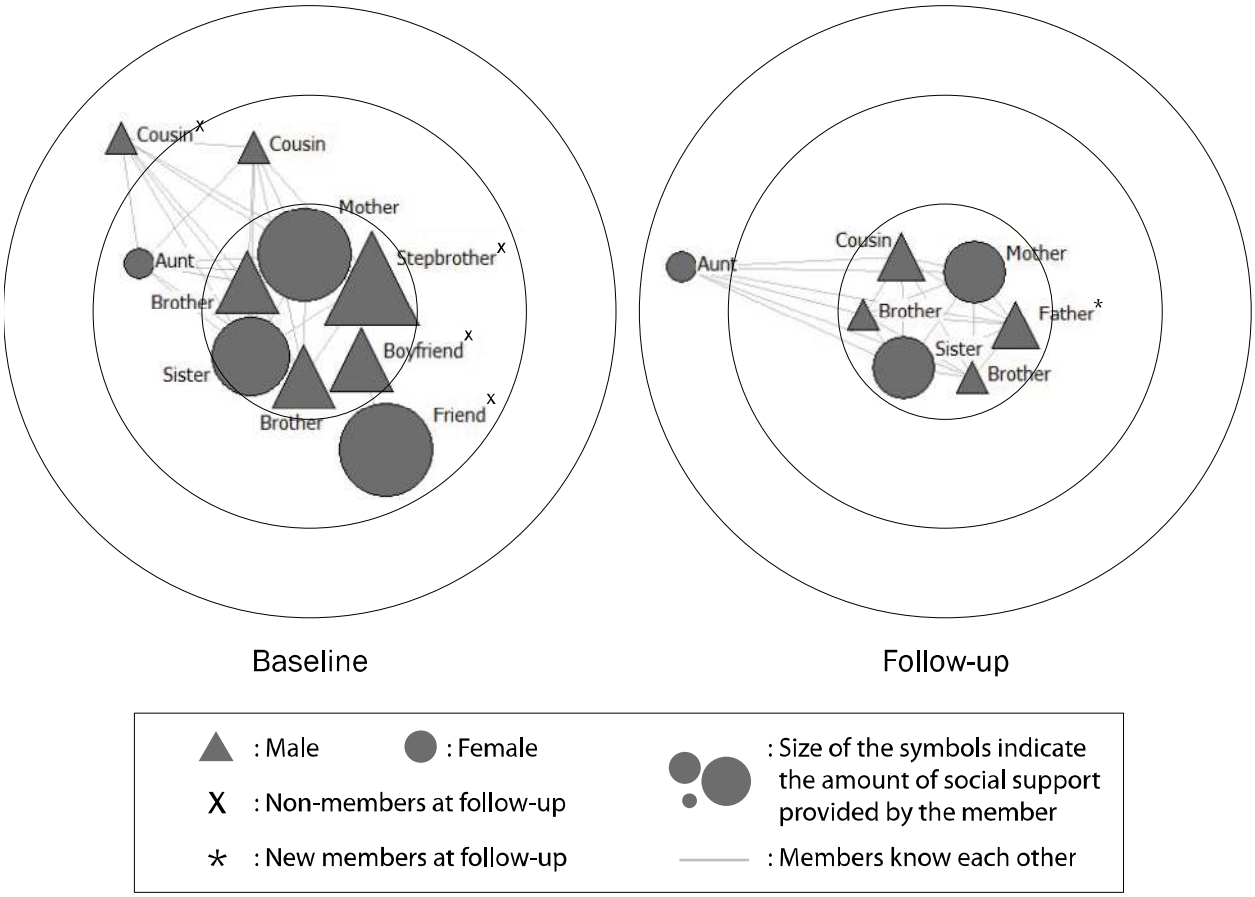


Figure 8.3. Example of deterioration (family-focused, more support functions)

At baseline, the participant's social convoy followed the family-focused, more support functions pattern (Figure 8.3). In the inner circle, the participant included her mother, three biological siblings (everyone on record), her stepbrother (not on record), and her boyfriend who was also in the residential treatment center. These members provided 2 to 4 social support functions each at baseline. Other social convoy members included her aunt, two cousins, and a friend in the same residential treatment center. At follow-up, the participant did not include any peers in her social convoy. She also excluded her stepbrother, but instead included her father in the inner circle at follow-up. One of her cousins moved into the inner circle at follow-up but the other cousin became a non-member. Overall, mothers' and siblings' social support decreased

over time. The participant's mother and two brothers visited the participant twice during the second and third months of treatment. With the decrease in network size and decrease in parental and sibling social support, the participant's total amount of social support decreased from 21 functions at baseline to 6 at follow-up.

Summary

Overall, participants in this study showed an increase in behavioral problems during the first three to four months of residential treatment. The family-focused, fewer support functions cluster was the only group that showed a decrease in behavioral problems over time. Of the four participants who recovered completely, three had family-focused, fewer support functions social convoys at baseline. An example of this case showed an expansion of the social convoy by addition of siblings at follow-up and increased social support from stable relationships.

Chapter 9: Discussion

This study explored how social relationships of foster youths change during the first few months of residential treatment for behavioral problems. Research indicates that transitions such as a placement move or a school transfer may negatively affect foster youths' behavior (Rubin, O'Reilly, Luan, & Localio, 2007; Sullivan, Jones, & Mathiesen, 2010). With no prior research on the effects of such transitions on social relationships, this study described the social convoys of foster youths during a significant transition period soon after entering a very unique environment. This chapter offers an interpretation of the major findings and a discussion of the methodological and theoretical contribution of this research.

How Do Foster Children's Social Convoys Change during Residential Treatment?

Foster youths in this study included a variety of close and important[7] individuals in their social convoys. Social convoys varied greatly in network size, ranging from just one individual to forty-two members. Although excluded from analyses, one participant did not include anyone in his social convoy at follow-up. Participants rated kin members, especially parents, as closer and more important to them compared to non-kin, and those closer relationships provided more social support. This supports the convoy model of social relations which states that inner circle relationships are likely attachment figures that provide most of the social support coming from the social convoy (Levitt, 2005). Research also indicates that although some foster youths might have mixed feelings about their biological parents, they still consider their parents as very important (Bailey, 2010).

Although this study did not attempt to draw inferences beyond the study sample, nonparametric statistical tests revealed some noteworthy patterns that could aid in building

[7] The Children's Convoy Mapping Procedure uses levels of closeness and importance ("most close and important" to "not as close but still important") together to categorize social convoy members.

hypotheses for future research. Structurally, the proportion of peers within each social convoy decreased from baseline to follow-up while the proportion of kin increased over time. This trend occurred among girls and among participants that had fewer types of child maltreatment history. First, girls included more peers in their social convoys at baseline compared to boys. However, after three months of residential treatment, girls and boys did not differ in the proportion of peers in their social convoys as girls nominated fewer peers than before. The baseline finding supports previous research on how early adolescent development varies by gender. More specifically, girls receive more social support from peers than do boys during this developmental phase (Bokhorst, Sumter, & Westenberg, 2010; Nickerson & Nagle, 2005; Rueger, Malecki, & Demaray, 2008). So, among girls, entering a residential treatment center may have provided an opportunity to make new friends within the facility as well as in their new schools outside of the facility.

On the other hand, the decrease in the proportion of peers and the replacement by kin members in girls' social convoys at follow-up merit further comment. Pre- and early adolescent girls have larger but more unstable peer networks compared to boys (Chan & Poulin, 2007; Ellis & Zarbatany, 2007). Ellis and Zarbatany (2007) also found friendships to be shorter among youths that are aggressive toward peers. Moreover, among early adolescent girls, depressive symptoms lead to decreased peer support, possibly due to withdrawal, peer rejection, or selective friendships with other depressed girls that are unable to provide lasting social support (Stice, Ragan, & Randall, 2004). As girls in this study had significantly more depression, aggression, and conduct problems than boys at baseline, they may have been more inclined to switch friends than boys. Instead of replacing old friends with new friends, girls substituted them with kin members while maintaining their network size.

Multiple factors may explain the girls replenishing their social convoys with kin. The school-based study by Levitt et al. (2005) found that while boys' social convoys remained similar over a period of two years, girls' social convoys changed structurally. Girls whose initial sources of social support were immediate family subsequently added more peers to their social convoys. On the other hand, girls who initially received social support from both immediate family and peers added more extended family members to their social convoys (Levitt et al., 2005). Over time, girls try to balance their sources of social support by adding different and potentially helpful relationship categories. At the same time, the current child welfare policies and practices emphasize creating and preserving family connections. Therefore, the residential treatment practitioners may have put more effort in eliciting kin social support for girls that were more peer-oriented at intake. By the time of follow-up, girls in the current study may have lost or abandoned their connections with old friends, and some of the new friends they had made within the treatment facility may have left. According to the literature, girls care more about same-sex, one-on-one friendships and seek more emotional support such as intimacy, affection, and nurturance than boys (Rose & Rudolph, 2006). However, behavioral problems that interfere with providing emotional support as well as short lengths of stay may explain their not forming new intimate relationships. Moreover, fewer girls resided in the participating residential treatment centers, limiting the pool of potential same-sex friends for girls. The process of making new friends amid the fluctuating social environment of residential treatment centers needs further research.

Based on the literature and the sample distribution, this study compared participants that had experienced zero, one, or two child maltreatment types and those that had experienced three or four child maltreatment types prior to residential treatment. Youths that had experienced fewer

child maltreatment types showed a decrease in the proportion of peers and an increase in the proportion of kin. However, the proportions of peers and kin did not change among youths that had experienced three or four child maltreatment types. A history of multiple types of child maltreatment is related to more problems in emotion regulation and externalizing behavior (Kim & Cicchetti, 2010), which may influence foster youths' ability to develop and maintain meaningful relationships with even kin members. Further, interactions with kin members may not always be positive experiences for foster youths (Browne & Moloney, 2002; Nickerson et al., 2006). Nonetheless, certain youths in this study valued those relationships more than others. Moreover, kin members were more stable than non-kin members during the first three months of treatment. Despite their physical absence, kin members have more potential to become permanent relationships for foster youths who have experienced many network disruptions including those following parental abuse or neglect (Perry, 2006). Future research will benefit from examining the reasons why foster youths include or exclude family members as treatment progresses.

The functional properties of social convoys were also fairly stable. An exception was the average amount of tangible aid, which increased from baseline to follow-up. This was mainly due to the increase in the proportion of social convoy members identified as persons that would take care of the participant if he or she became sick. Member-level analysis also indicated that social convoy members who provided this particular support function were more likely to remain in the convoy through follow-up. The increase in average tangible aid was especially evident among participants with more than four years of out-of-home care history and more than four prior out-of-home care placements. Youths who had been in foster care longer and had more placement moves may have felt in the beginning that they had no one to rely on as the

cumulative transitions up to residential treatment may leave foster youths with fewer trusting relationships (Hyde & Kammerer, 2009; Stott & Gustavsson, 2010; Unrau et al., 2008). At the same time, some foster youths may encounter a new placement as an opportunity to reconnect with their family (Unrau et al., 2008). Both factors fit into the convoy model of social relations (Kahn & Antonucci, 1980) in which properties of the situation – in this case, a new environment after multiple experiences of rejection – influence an individual's need for social support that triggers modification of the social convoy. Perhaps the most desired type of social support for foster youths with longer and more complex out-of-home care history, while adjusting to group care, is the belief that someone will actually take care of them in times of trouble. Foster youths in residential treatment centers may continually reconstruct their social convoys by evaluating each member's potential to provide specific types of social support.

How Do Foster Children's Relationships with Social Convoy Members Change?

As expected, parents were most likely to be in the inner circle followed by siblings and extended family. While the mean social convoy size did not change significantly over time, the average member turnover rate was nearly 50 percent. In other words, participants lost or abandoned about half of their social convoy members in three months but replaced them with new members. Structurally, closer relationships were more stable over time compared to relationships that had relatively lower tie strength. Functionally, closer relationships provided more social support functions. Controlling for tie strength and other member-level and convoy-level variables, siblings and extended family members provided less social support compared to parents at both baseline and follow-up. However, a significant interaction between relationship category and time existed for tangible aid. Parents and non-family adult members provided

similar amounts of tangible aid at baseline, but at follow-up, parents' mean amount of tangible aid increased while non-family adult members' provision of tangible aid decreased.

While kin members may provide more tangible aid than non-kin (Rook & Ituarte, 1999), early adolescents rate affective support as the most important and frequently received type of parental support (Malecki & Demaray, 2003). Thus, the increase in tangible aid by parents in this study suggests that foster youths in the early stage of residential treatment may have different needs for social support as mentioned earlier. Considering the physical absence of parents (more than half of the participants had no visits from parents during the study period), this increase may reflect foster youths' tendency to include family members in their social convoys as an expression of hope and need for connection (Bailey, 2010; Preyde, Cameron, Frensch, & Adams, 2011; Samuels, 2008). Moreover, these foster youths may be in another phase of experiencing ambiguous loss of family relationships, during which family members are physically absent but have strong psychological presence (Samuels, 2009).

The decrease in tangible aid by non-family adults was due to their high mean turnover rate (68%). Further examination of data indicated that non-family adults that provided tangible aid at baseline but became non-members at follow-up were mostly former foster parents and adult family friends or neighbors. Paradoxically, these lost ties could have been valuable sources of support. Maintaining social relationships with non-family adults such as former caregivers and neighbors may serve to compensate for the low level of parental support (Farrugia, Greenberger, Chen, & Heckhausen, 2006). Also, developing trusting relationships with non-family adults may facilitate better adaptation for foster youths (Drapeau et al., 2007). On the other hand, non-family adults who provided tangible aid at baseline and continued to do so as social convoy members at follow-up were former residential treatment or group home staff and Court-Appointed Special

Advocates (CASA). Such formal relationships may allow the maintenance of connection with the youths as they transition from one placement to another, but further research is necessary to confirm this postulation.

A more remarkable finding is that among the forty-one non-family adults who became new social convoy members at follow-up, thirteen individuals provided tangible aid and eleven of those were current residential staff. This finding supports emerging knowledge that some foster youths may perceive social relationships with residential treatment staff as valuable and reliable (Bailey, 2010). However, the emphasis on utilizing residential treatment as a temporary intervention has extended to include temporary relationships with residential treatment staff. On the other hand, Stott and Gustavsson (2010) argue that if a foster youth has created stable social relationships within a group care facility, keeping the youth in the facility may be better than transferring the youth to a different home for the sole purpose of providing a less restrictive environment. In residential treatment centers where peers continually come and go and family members can be nonexistent, discouraging bonding with the staff may be, for some foster youths, depriving an opportunity to connect at all.

Are There Distinct Social Convoy Types among Foster Children in Residential Treatment?

This study found four distinct types of social convoys among foster youths entering residential treatment. A unique type that did not appear in previous research among youths in the general population (Jackey, 2009; Levitt et al., 2005) is the family-focused, fewer support functions type. Social convoys of this type were small, tight-knit networks of kin members who did not provide much social support compared to kin members in the balanced-supportive and the family-focused, more support functions clusters. At baseline, they were structurally similar to the family-focused, more support functions type except for the amount of social support provided.

The opposite of the two family oriented social convoy types was the peer-focused type, characterized by relatively sparse and unstable networks of peers who provided few social support functions and engaged in negative interactions with the participants. On the other hand, the balanced-supportive type contained large networks that provided above average social support from diverse relationship categories.

To date, studies that have employed the pattern-centered approach of the convoy model of social relations are scarce. Levitt et al. (2005) found three types of social convoys among youths transitioning from middle childhood to adolescence: those receiving social support from immediate family members only, a second group that received social support from immediate family and extended family members, and the rest who received social support from immediate family and friends. While the differences among the three types are clear, a common attribute is the presence of supportive immediate family. In this study, however, social support was not always available. This reflects how the particular sample composition is one of the deciding factors for the types of social convoys that can be identified in a study (Fiori et al., 2007). This study clearly points out the different views between foster youths and non-foster youths regarding their own social relationships. Some foster youths may consider their family important but not as supportive as others, and some may rely solely on friends more early on. This may be especially true for those in residential treatment centers because of their out-of-home care and child maltreatment history that led up to such high level of care. Because of current policies and practices that discourage the use of residential treatment centers, by the time a youth enters such service, families may be burned out, frustrated, and overwhelmed to provide any support (Sharrock, Dollard, Armstrong, & Rohrer, 2013).

Another unique contribution of this study is that it observed short-term changes in the social relationships of foster youths during residential treatment, beginning at intake. While the structural and functional properties of social convoys as a group were quite stable over time, the four social convoy types transformed significantly over the three months of treatment as a result of high member turnover. The aforementioned study by Levitt et al. (2005) reports a similar phenomenon. Using cluster analysis, they discovered the same social convoy types at baseline and two years later. However, there was considerable change within each social convoy, with 46 percent of the social convoys switching to a different type at follow-up. While the convoy model of social relations is useful for generating profiles (Levitt et al., 2005), it is important to consider individual changes that occur. Generating clusters based on the changes in the social convoys rather than the convoy properties at one point in time may capture the dynamic nature of social convoys among foster youths during residential treatment.

In the current study, more supportive social convoy types became less supportive while the less supportive types became less negative. Members of balanced-supportive social convoys became closer and more important to the youth but provided fewer social support functions than before. Family-focused, more support functions social convoys were structurally stable, but negative interactions with extended family members increased over time. On the other hand, family-focused, fewer support functions social convoys became structurally more scattered with more people in the outer circles. Functionally, the average amount of social support provided by the members stayed the same but negative interactions with kin decreased. The peer-focused social convoys had increased amounts of support from kin and decreased amounts of negative peer interactions at follow-up, although they still had more peer social support than the other types.

As discussed earlier, the convoy model of social relations conceptualizes social convoys as evolving over time due to personal and environmental factors that change the individuals' need for social support (Kahn & Antonucci, 1980). In this study, the baseline social convoy types were not associated with any of the measured personal characteristics such as demographics and out-of-home care history. However, numbers cannot fully describe the complexity of the foster youths' past experiences. Moreover, other current factors may be associated with the structural and functional changes in the identified social convoy types. Unmeasured variables that may have influenced the social convoy types to change over time include individualized treatment process for each participant and the group dynamic within the facility during the study period. First, clinicians modify therapy sessions to address specific problems for each client, but group-level measurements such as types of services provided cannot capture such practice (Libby et al., 2005). For instance, some clinicians may have focused on restoring family relationships for certain youths based on their individual needs. The same may be true for other practitioners involved in residential treatment, such as case managers, child care staff, and county social workers. They may have helped youths with family-focused, fewer support functions or peer-focused social convoys to find or keep in touch with kin members and receive social support from them. With the emphasis on treating the entire family as a unit, it is also possible that kin members of certain social convoy types received interventions that target modification of their attitudes and behaviors toward the youths.

Second, the data collection phase of this study lasted 16 months during which the participating residential treatment centers experienced constant turnover of residents. It is likely that the changing group structures and processes influenced the participants' beliefs, emotions, and actions toward their social convoys (Forsyth, 2006). Negative peer influence on behavioral

problems of youth in group treatment settings is well documented. For instance, the presence of other youths who engage in or enjoy conversations about rule-breaking behaviors may alter the effectiveness of residential treatment (Zakriski, Wright, & Cardoos, 2011). On the other hand, the effects of peers and group dynamic on youths' view of family relationships is unknown. In the future, combining egocentric and sociometric social network methods may help explain how group structures and processes factor into the changes in the personal networks within residential treatment centers.

How Do Social Convoys Relate to Behavioral Problems?

Whereas previous research indicates that having diverse social relationships leads to positive outcomes across the life course (Fiori et al., 2006; Levitt, 2005), this study found otherwise. Participants who had family-focused, fewer support functions social convoys at baseline had the best behavioral outcome while participants who had family-focused, more support functions convoys had the largest increase in behavioral problems, especially conduct problems and depression/anxiety issues. Moreover, five out of six participants who clinically deteriorated had family-focused, more support functions social convoys at baseline while three out of four participants who showed clinical improvement had family-focused, fewer support functions social convoys. The increase in negative interactions with kin among family-focused, more support functions convoys and the decrease in negative interactions with kin among family-focused, fewer support functions convoys over time suggest that the quality of relationships between youth and family members may have influenced the participants' behavior. In fact, prior studies demonstrate that negative interactions with family relate to adolescents' behavioral problems (Hoefnagels et al., 2007), including depression (A. Lee et al., 2010). While this study only measured conflict and criticism as facets of negative interactions, future studies

should include other relevant concepts such as lack of warmth, rejection, unfair treatment, betrayal, and dishonesty (Hoefnagels et al., 2007; Hyde & Kammerer, 2009). Due to their multiple placement moves (Hyde & Kammerer, 2009), unkept promises for permanency (Samuels, 2008), and frequent cancellations of family visits (U.S. Department of Health and Human Services, 2003), the feelings of rejection, disappointment, and betrayal may reveal more about the youths' family relationships than conflict and criticism alone.

An alternative explanation for the contradictory finding is that there may be unmeasured social convoy functions. They may even be particularly meaningful for foster youths in residential treatment centers. The reason other studies found diverse social networks more helpful for youths is because different relationships may fill in different needs that stem from the youths' experiences (Perry, 2006). Moreover, individual and developmental differences exist in terms of which type of social support is important to the youth (M. Lewis, 2005). The family-focused, fewer support functions social convoys did not provide much of the six social support functions specified in this study, but may have provided other types of social support that were not measured. For example, the clinical improvement example showed that the participant received increased amount of family social support over time, partly by adding four siblings to his social convoy at follow-up. Although the siblings did not provide much social support, their role in the social convoy should not be minimized as this study did not measure sibling-specific functions such as sibling nurturance, companionship, and competition included in other studies (M. Lewis, 2005; Linares et al., 2007). On another note, it is also possible that residential treatment practitioners and county social workers played a role in the appearance of siblings three months after entering a new placement. As discussed earlier, residential treatment practitioners may have deliberately provided more help and services to youths who lacked kin

social support (Collins, Spencer, & Ward, 2009), resulting in those youths' behavioral improvement.

The distribution of behavioral problems in the sample requires attention when interpreting the results. Initially, girls in this study had more behavioral problems compared to boys, which is consistent with previous research suggesting that placing girls in residential treatment centers perhaps requires more serious problems than placing boys (Baker, Archer, et al., 2005; Connor, Doerfler, Toscano Jr, Volungis, & Steingard, 2004; Handwerk et al., 2006). What is not consistently supported by the literature is that behavioral problems of youths in this study generally increased from the first month to third month, resembling a pattern known as the honeymoon effect. In a study using archival data from residential treatment centers, dosReis et al. (2010) found that the frequency of seclusion and restraint usage for managing acute aggression or suicidal behavior was very low in the first month of treatment but increased dramatically during the second and third months. On the other hand, research in short-term intensive residential treatment and acute psychiatric treatment settings shows no such honeymoon effect or a very short one lasting less than a week (Blader, Abikoff, Foley, & Koplewicz, 1994; Leichtman, Leichtman, Barber, & Neese, 2001).

That the study sample's baseline behavioral problem score was similar to the outpatient normative sample, when it should have been closer to the inpatient normative sample, suggests that a honeymoon effect may have existed. dosReis and colleagues (2010) describe that both youths and staff may contribute to this effect through changes in their perception and behavior. Youths may initially try to appear well-behaved while they are adjusting to a new environment and then start to exhibit more behavioral problems as they become aware of the prospect of staying long-term. Staff may be more attentive and flexible toward new residents in the

beginning and become more strict as their expectations rise (dosReis et al., 2010). In this study, it seems that the honeymoon effect was greatest for youths who had family-focused, more support functions social convoys at baseline as their behavioral problem scores increased the most. Youths with large amounts of perceived family support at intake may have tried to behave better to increase their chances of reunifying with their family. However, long-term treatment plans or failed reunification plans may have negatively affected the youths' behavior after the honeymoon period. Residential treatment practitioners and researchers should further examine whether or not positive appearances of youths in the early stage of treatment – deliberate control of behaviors and strong family support – work to their disadvantage via unequal distribution of help and services.

Methodological Contribution

Pattern-centered approach. This study used the pattern-centered approach to study the association between social relationships and youth behavior. Instead of examining the effects of isolated relationship properties such as network size while controlling for other properties, this study found patterns that contain multiple properties that concur to influence an individual. Such approach better reflects the reality in which personal social networks include a combination of relationship properties such as small networks with high density and high emotional support or large networks with weak tie strength and high informational support (Antonucci et al., 2010; Fiori, Antonucci, & Akiyama, 2008). While the social convoy mapping technique has been used qualitatively in research involving foster youths (Bailey, 2010; Samuels, 2008), this study was the first to identify social convoy patterns in a sample of foster youths in residential treatment centers.

In pattern-centered approach, the researcher can specifically select relationship variables most relevant for the study sample, while simultaneously limiting the types of social convoys that can be identified (Fiori et al., 2007). This study used network size, average tie strength, density, average social support, and proportions of social support from different relationship categories to perform cluster analysis. If the sample had more variation in negative interactions or visitations, analysis including those variables may have resulted in different types of social convoys. Nevertheless, this study showed that the pattern-centered approach to studying foster youths' social relationships is feasible and may prove useful in identifying areas of intervention during residential treatment.

Clinical use of the social convoy mapping technique. This study tested the feasibility of a tool to assess foster children's social relationships during residential treatment. The Children's Convoy Mapping Procedure is a visual instrument to measure the personal network's hierarchical structure and functional properties. In this study, the researcher added to the procedure extra components to measure network density and negative interactions. Such visual diagrams have been used in clinical practice with children. Visual diagrams can organize vast amount of information about the child's ecological system through time (Hartman, 1995). The most salient advantage of using visual diagrams in therapy is that it facilitates easy communication, encourages active participation, and assists with building rapport and collaboration between the youth and the clinician (Bailey, 2010; Chase, Medina, & Mignone, 2012; Hartman, 1995). When conducting this study, the participants readily shared their thoughts once presented with the diagram template, and some participants asked for their own piece of paper so they can complete a parallel diagram. The researcher also encountered conversation

opportunities when participants placed a member completely outside of the social convoy diagram or on the border between two circles, or equated a member to self.

Using visual diagrams could also empower youths by helping them gain a better understanding of self and giving them control over defining their own social convoys (Curry, Fazio-Griffith, & Rohr, 2008; Hartman, 1995). The Children's Convoy Mapping Procedure places the youth in the center of the concentric circles of relationships, which may have symbolic importance for foster youths who have experienced many losses in their lives. Clinicians can use the diagram to help youths identify their support network and to determine what kind of changes *they* want in their social convoys (Curry et al., 2008). Such practice may lead to reconnecting with certain relationships or to devise other interventions (Hartman, 1995).

Lastly, the ease and effectiveness of using visual diagrams in therapy would be fitting for developing practitioner-led research (Bailey, 2010). This study revealed that although foster youths' social relationships change rather quickly, it is possible to track those changes systematically. Residential treatment practitioners can use the Children's Convoy Mapping Procedure regularly to assess youths' social relationships, to intervene to strengthen the most important relationships, and to measure and evaluate the changes made.

Theoretical Contribution

Continuous reconstruction of social convoys. This study revealed that foster youths in the inherently fluctuating social environment of residential treatment centers reconstruct their social convoys within a short period of time. Entering a residential treatment center was a non-normative (i.e. atypical) life transition that all of the participants experienced in common. Such transitions can directly affect an individual's social convoy (Wrzus, Hänel, Wagner, & Neyer, 2013). For example, relocation accompanied by a school transfer during adolescence may lead to

behavioral problems through changes in the youth's peer network (South, Haynie, & Bose, 2005, 2007). In the face of non-normative life transitions, the protective function of social convoys becomes even more important. For instance, Pina et al. (2008) document that non-kin social support reduced the level of posttraumatic stress reactions among youths that had experienced family network disruption and displacement due to a natural disaster.

According to the convoy model of social relations, environmental attributes directly influence the individual's need for social support as well as the social convoy itself (Kahn & Antonucci, 1980). Moreover, the need for social support mediates the link between environmental attributes and the social convoy. In the current study, the transition into a residential treatment center seems to have increased the need for long-term tangible aid, i.e. having someone who would provide care. Whereas individual foster homes have a single caregiver or a couple, residential treatment centers in this study had multiple child care staff working in shifts. While residential treatment staff may be better able to control behavioral crises (Hyde & Kammerer, 2009), individual foster caregivers may have more attachment-like relationship with foster youths (Bailey, 2010). Foster youths in group care are significantly less likely than those in individual foster homes to feel that their care providers care a lot about them (Perry, 2006). Due to the increased need for long-term tangible aid, foster youths in this study seem to have reconstituted their social convoys to ones that provide more tangible aid by keeping certain members and drawing more support from existing members. Future research should include ways to accurately measure the youths' perceived need for certain types of social support.

The whole network structure of the residential treatment centers seems to have directly influenced the social convoys as well. When foster youths enter residential treatment, the government authorities and the residential treatment center regulate the youths' contact with

families and other relationships (Sharrock et al., 2013). Within the residential treatment centers, the continual and unpredictable movement of peers in and out of the environment creates emotional disturbance among youths (Hyde & Kammerer, 2009). The physical and emotional availability of others as well as the emotional capacity of the youths may influence how they reconstruct their social convoys during the transition period.

Figure 9.1 shows the possible determinants and effects of social convoys for foster youths in residential treatment centers, adapted from the original model by Kahn and Antonucci (1980). A youth's past experiences, such as child maltreatment and out-of-home care history, have already influenced his past social relationships and behavioral problems, ending in his placement in a residential treatment center. Upon entering the residential treatment center, the youth experiences physical removal from his past neighborhood, encounters a different caregiving structure involving multiple staff, meets many new people in both formal and informal contexts, and likely transfers to a new school. This entry to residential treatment center also affects the youth's past relationships because of the physical distance and other barriers to contact. The youth's past experiences, move to a residential treatment center, and past relationships all influence the youth's current need for social support, as well as who is available to fulfill the need.

Due to the change in the need for social support, the youth reconstructs his social convoy. The reconstruction process involves both voluntary (e.g. abandoning a relationship) and involuntary (e.g. losing contact) actions, also influenced by the aforementioned personal and environmental factors. Then, the reconstructed social convoy influences the youth's behavior through its protective and negative functions. The youth's behavioral problems, in turn, further influences past relationships and residential treatment components such as the individual

treatment approach and the group dynamic. Other treatment components, such as the movement of peers in and out of the residential treatment center, the youth's relationships with staff, and the youth's response to treatment influence his need for social support again. Thus, the youth reconstructs his social convoy repeatedly, although the speed of going through the cycle may vary by individual. While this study could not statistically test all of these links, it added a time component in applying the convoy model of social relations for foster youths in residential treatment centers.

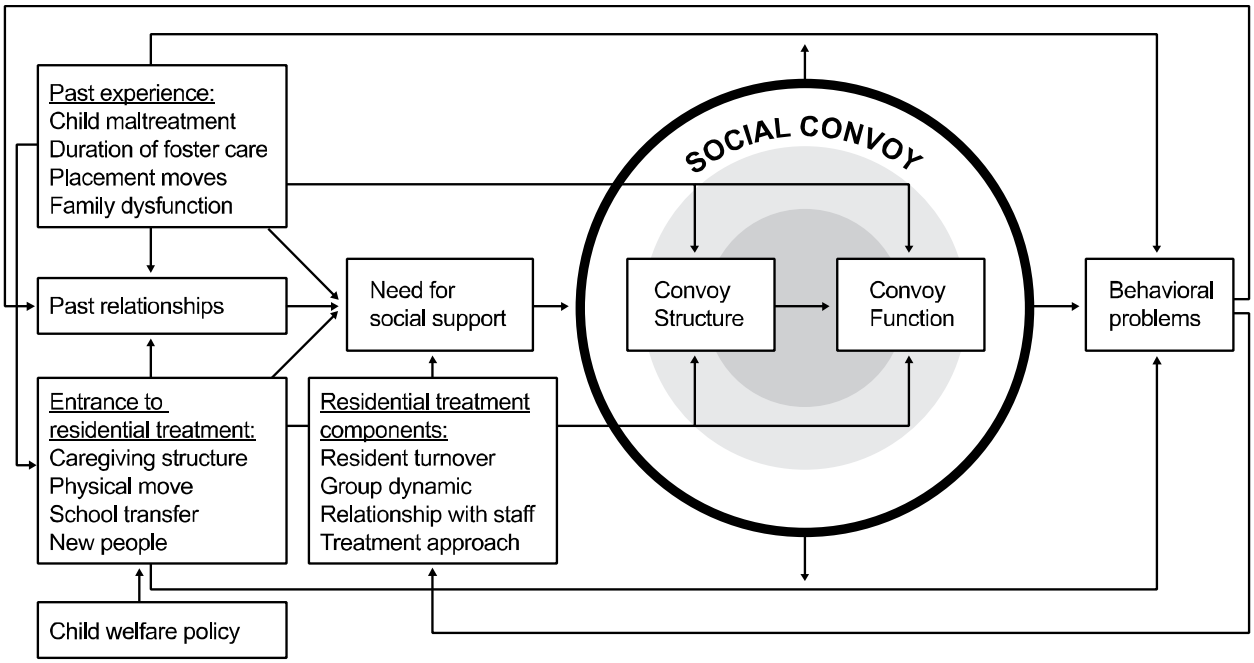


Figure 9.1. Determinants and effects of social convoys of foster youths in residential treatment

Negative function of social convoys. As the name implies, the convoy model of social relations emphasizes the protective function of social convoys as vehicles of social support. This

study attempted to measure negative functions that these vehicles may carry because foster youths in residential treatment centers live with peers who have high levels of behavioral problems and tend to have extensive family dysfunction (Connor et al., 2004). The results indicated that the negative aspect of social convoys is minimal compared to the amount of social support they provide. While foster youths in residential treatment centers may often experience negative interactions, they choose not to include the individuals associated with those interactions in their social convoys. During several interviews, when the researcher asked the participant to point out anyone who "says mean or harsh things to you," the participant named someone not on the social convoy diagram. When the researcher asked if the participant would like to add the individual to the social convoy, the participant adamantly refused. This could explain why parents' negative interactions increased over time while peers' negative interactions decreased in this study. Youths can easily exclude peers from their social convoys, but they may consider parents important despite the negative interactions and may even perceive negative interactions as a normal part of family relationships (Preyde et al., 2011). In fact, negative interactions with family may be related to the relationships becoming emotionally closer over time (Fung, Yeung, Li, & Lang, 2009). Despite the minimal amount of negative interactions, the four social convoy types did have differing amounts of negative interactions with parents and peers. Thus, research should continue to examine the negative functions of social convoys.

Limitations

This study addressed four exploratory and descriptive research questions using a small, specific sample. Moreover, the use of bivariate and cluster analyses prevents the researcher from drawing conclusions about causality. In bivariate analyses, multiple testing likely increases the chance of finding a false significant result. However, the researcher did not make multiple test

adjustments (e.g. Bonferroni correction), as the exploratory nature of the current study does not require such adjustments (Bender & Lange, 2001). This study did not have predetermined hypotheses, and used multiple tests only for descriptive purposes. Therefore, the results presented in this dissertation cannot be generalized, and further research is necessary to confirm the results with testable hypotheses (Bender & Lange, 2001).

Although this study did not attempt to generalize the findings to a larger population, issues in sampling warrant attention. Just before recruitment began, the county child welfare department implemented a policy amendment to reduce the number of children aged 12 and younger in group care. Consequently, it became more difficult than before to place a younger child in residential treatment centers. As a result, it is possible that younger participants in this study had behavioral problems and family backgrounds that are more serious than older participants that eventually allowed their placement in residential treatment centers. Moreover, recruitment and data collection lasted 16 months due to the overall low admission rate of foster youths from the county that the researcher obtained permission from. As residential treatment centers continue to serve older and more troubled foster youths, it is important to continue to develop an appropriate knowledge base to help strengthen youths' social convoys.

Measurement issues also existed while conducting this research. The Children's Convoy Mapping Procedure has never been tested with foster care population. It contains some questions that may not have applied well to some social relationships in the out-of-home care context. For example, to the question "is there anyone who likes to spend time with you?" some participants asked if they can nominate someone who cannot actually spend time with them. Others seemed to nominate those people without considering the discrepancy between the reality and what they think those people like to do. Seibert and Kerns (2009) report similar issues when using the

nomination method, in that whether or not children can nominate someone as providing a specific social support function may depend on the person's physical availability. For instance, in non-foster care settings, a sibling could help the child with school work, but in residential treatment centers, staff or peers may provide such help more frequently.

Omitted variables discussed so far include individual treatment approaches, the group dynamic change within the treatment milieu, and different types of social support and negative interactions that are directly relevant to foster youths. Another variable that this study did not include is the frequency of contact other than visitation. Frequency of contact can be a distinguishing factor in some social convoy patterns (Fiori et al., 2008). Yet, in this study, there was not enough variation in the frequency of visitation during the first few months of residential treatment as some participants were still awaiting visitation approval. Using archival data, Robst et al. (2013) examined monthly family contact patterns during residential treatment and found that children had phone contact in more than half of the months. While youths in this study may have contacted their family and friends by phone or internet, archival data on such modes of contact was not readily available for this study. Although self-reports of frequency of contact in residential treatment centers may not be accurate (Nickerson et al., 2006), youths' perceptions of contact frequency may still reveal an important aspect of their relationships.

Directions for Future Research

Future research should include more in-depth exploration of reasons why foster youths in residential treatment centers include and exclude certain relationships in their social convoys. It would help clarify the link in the convoy model of social relations that this study did not explicitly examine: the mediating role of the need for social support in the association between personal and environmental attributes and the reconstruction of the social convoy. Useful

approaches may include qualitative case studies that examine each social convoy more rigorously. While the current study lost some information by coding social convoy members into five broad relationship categories, such in-depth approach may reveal differences among biological, adoptive, blended, and foster families.

In addition, practitioner-led research would allow for an examination of how treatment approaches and legal and personal circumstances of family members influence foster youths' social convoys during residential treatment. Further, future research should assess the degree to which foster youths are satisfied with their current social convoys, identify unmet needs for social support, and devise and test interventions to address those needs. Strengthening social convoys may influence not only youth behaviors and emotions but also other areas of life such as physical health and academic achievement (Duncan, Duncan, & Strycker, 2005; Legault, Green-Demers, & Pelletier, 2006).

Conclusion

Three parties influence foster youths' social convoys during residential treatment: the treatment environment, the past, current, and potential social convoy members, and the youths themselves. Residential treatment centers provide structure and instability at the same time. They provide the whole social network that is in constant flux of individuals as well as restrict the physical availability of certain social convoy members. They are also under the influence of policies and treatment approaches that affect the foster youths' social convoys. The relationships between foster youths and their social convoy members need to be understood in the context of the youths' out-of-home care history. These members have varying levels of involvement, motivation, and capabilities to provide social support due to the youths' and their past experiences, shared or not shared. Foster youths respond to these environmental and

interpersonal factors and reconstruct their social convoys while transitioning to a residential treatment center, resulting in distinct patterns that may influence their behavior. This study presented a picture of what some foster youths' social convoys look like during their early adaptation in residential treatment. The distinct patterns may have emerged from the youths' complicated past, but their changing properties imply that the present social environment has a strong influence.

Appendix A
Summary of studies on children's social relationships

Out-of-home care sample

Source	Purpose of study	Sample	Method	Measures	Results
Keller et al. (2001)	Compare behavioral problems of children in kinship care to those of children in non-kin foster homes and children in the general population	• Foster children who had been in Casey Family Program (in 14 states) for at least 1 year • N = 240 • Age = M 14 • 46% male	• Longitudinal survey • Used agency clinical records at intake and after 12 months	• Child Behavior Checklist	• Children in kinship care had significantly fewer behavioral problems than children in non-kin foster homes(effect size .54)
Leathers (2005)	Examine the relationship between sibling placement patterns and placement disruption	• Foster children in individual foster homes randomly selected from Cook County (Illinois) • Children who had been in out-of-home care for 1~8 years and had at least one sibling in care • N = 197 • Age = 12 and 13 • 49% male	• Longitudinal method • Phone interviews with caseworkers and foster caregivers • State records for 5 years after initial data collection	• Placement disruption = moving to another out-of-home placement • Sibling placement patterns (categorical)	• Separation from siblings during care significantly increased odds of placement disruption (odds ratio = 2.68)
Linares et al. (2007)	Study the influence of sibling placement patterns and sibling relationship quality on child behavioral problems	• Foster children in individual foster homes from 12 foster care agencies in New York City • Siblings who entered foster care system at the same time • N = 158 • Age = older sibling M 10, younger sibling M 7 • 58% male	• Longitudinal method • Data at intake and 10~15 months later • Individual survey interviews with children and biological parents	• Eyeberg Child Behavior Inventory • Loneliness and Social Dissatisfaction Scale • Child Depression Inventory • Sibling placement patterns (categorical) • Sibling Relationship Questionnaire	• Regardless of sibling placement pattern, positive relationship with sibling related to fewer behavioral problems at follow-up • Negative relationship with sibling related to more behavioral problems at follow-up (effect size not available)

Appendix A
Summary of studies on children's social relationships - Continued

Source	Purpose of study	Sample	Method	Measures	Outcome
Munson & McMillen (2009)	Study the influence of non-kin mentoring relationship on foster youths' psychosocial outcomes	• Foster children in Missouri child welfare system • Same-age cohort in 8 counties • N = 339 • Age = 17 at time of recruitment • 44% male	• Longitudinal survey • Individual interviews with adolescents at age 18, 18.5, and 19	• Depression Outcomes Module • Global Measure of Perceived Stress • Student's Life Satisfaction Scale • Dichotomous variable – had ever been arrested • Stability of mentoring relationship	• Having a long-term mentor was associated with less perceived stress at age 19 (effect size .30) and 54% decrease in the likelihood of having been arrested in the past year
Perry (2006)	Examine the relationship between strength of biological family, foster family, and peer networks and depression/anxiety	• Foster children randomly selected from 15 counties in Indiana • N = 154 • Age = 15~18 • 39% male	• Telephone interviews with youths	• Center for Epidemiological Studies – Depression Scale (CES-D) • Langner Index • Set of questions to measure strength of networks • Network size • Frequency of contact • Placement type	• Combinations of 2 or more strong network domains (e.g. strong biological family and peer networks) relate to fewer depression symptoms compared to no strong networks • Strong foster family network has a stronger positive influence on depression than strong biological family network
Rubin et al. (2008)	Examine the long term influence of kinship care on child behavioral problems	• Nationally representative sample of foster children • N = 1,309 • 48% male • 50% in kinship care	• Prospective longitudinal study (National Survey of Child and Adolescent Well-being, NSCAW) • Data collected at baseline, 18 months, and 36 months later	• Child Behavior Checklist	• Children in kinship care had .14 lower probability of having behavioral problems than children in non-kin foster homes at 18 and 36-month follow-up

Appendix A
Summary of studies on children's social relationships - Continued

Community sample

Source	Purpose of study	Sample	Method	Measures	Outcome
J. P. Allen et al. (2006)	Study effects of parent and peer relationships on depressive symptoms over time	• Students from one public middle school in the southeast • N = 143 • Age = M 13 at baseline • 48% male	• Longitudinal study with 1-year follow-up • At baseline adolescents came to interview with parents and then with best friend • At follow-up adolescents came to interview alone and then with current best friend	• Child Depression Inventory • Parent-child discussion on an area of disagreement was videotaped and coded • Inventory of Parent and Peer Attachment • Observation of adolescent asking best friend for help and solving dilemma with best friend • Withdrawal subscale from the Pupil Evaluation Inventory (peer rated)	• Lack of autonomy and relatedness with mother, lack of relatedness with peer, emotional dependency on peer, and social withdrawal predicted later depression symptoms (effect size .18) • Baseline depression symptoms predicted increase in social withdrawal over time
Carothers et al. (2006)	Examine whether social support buffers the relationship between exposure to negative life events and children's behavioral problems	• Children of adolescent mothers recruited from hospitals and teen parent service programs in two cities • N = 96 • Age (child) = M 14.41 • 55% male	• Prospective longitudinal survey • Children and/or mothers were interviewed before birth and when children were age 3, 5, 8, 10, and 11~17	• Life Events Checklist • Protective Factor Scale: children chose protective factors from a list and rated the importance of attachment, religiosity, support networks, and social groups/activities • Child Behavior Checklist and 3 other scales	• Social support served as a buffer between negative life events and internalizing behavioral problems (effect size .07) and externalizing behavioral problems (effect size .09)

Appendix A
Summary of studies on children's social relationships - Continued

Source	Purpose of study	Sample	Method	Measures	Outcome
Ellis & Zarbatany (2007)	Study the influence of victimization and aggression on friendship formation and stability	• Students from 4 elementary schools and 1 middle school in Canada • N = 605 • Age = M 12.05 • 57% male	• Longitudinal survey with 3-month follow-up • Group questionnaires	• Children nominated friends from the school roster • Children nominated up to 3 people in school who fit behavioral profiles of overt aggression, relational aggression, and victimization	• Overt aggression predicted friendship instability, and this was only so for younger children
Haynie (2001)	Examine how friendship structure moderate the association between peer delinquency and individual's delinquency	• Nationally representative sample of adolescents in 129 randomly selected schools • N = 90,000 • Age = 7^{th} grade ~ 12^{th} grade	• First wave of a longitudinal survey (Add Health) • Interviews in school and home	• Students nominated up to 5 male best friends and 5 female best friends using school roster • Self-report of participation in 14 delinquent activities	• When a student has delinquent friends and his/her network is dense (high proportion of friends nominated each other as friends), the student's likelihood of delinquency involvement increases by 139%
Hoefnagels et al. (2007)	Examine the influence of social support on behavioral problems	• Children of psychiatric patients in 3 clinics in Belgium • N = 40 • Age = M 13.98 • 63% male	• Cross-sectional survey • Individual survey interview	• Maastricht University Stress Instrument for Children • Social Support Inventory – Positive interactions, negative interactions, discrepancy between supply and demand of support • Youth Self Report (Child Behavior Checklist)	• Negative interactions had a main effect on behavioral problems, controlling for perceived stress (r= .63)

Appendix A
Summary of studies on children's social relationships - Continued

Source	Purpose of study	Sample	Method	Measures	Outcome
Kaynak et al. (2011)	Examine moderating effects of social support and community violence exposure on depressive symptoms	• Participants of a randomized controlled trial in 3 urban public middle schools in southeast • N = 216 • Age = 7th grade • 45% male	• Longitudinal survey • Predictors assessed first and outcome assessed 8 months later • Computer-assisted survey interview	• Children's Depression Inventory (CDI) • Survey of Children's Exposure to Community Violence • Network of Relationships Inventory – parent and other significant adult	• Exposure to violence was positively associated with depressive symptoms only for youth with low levels of social support (effect size .02)
Lansford et al. (2003)	Examine whether friendship quality moderates the relationship between negative parenting and externalizing behavioral problems	• Availability sample recruited from kindergarten pre-registration sites in Indiana and Tennessee • N = 362 • Age = 7th grade • 51% male	• Longitudinal survey • Data were collected every year from kindergarten to 7th grade • This study used data from 5th, 6th and 7th grades	• Negative parenting measured by a scale designed by the researchers – unilateral parent decision making, low supervision and harsh discipline • Friendship Qualities Scale • Externalizing subscale of Teacher Report Form (Child Behavior Checklist)	• When children had high friendship quality, the association between unilateral parenting and externalizing behavioral problems were mitigated (effect size .05)
Lee et al. (2010)	Test whether negative interactions with parents and peers mediate the relationship between social competence and depressive symptoms	• Adolescents from 5 schools in Chicago • N = 350 • Age = M 14.5 • 45% male	• Longitudinal survey • Data collected 3 times, 5 weeks apart • Written questionnaire for students in the classroom	• Children's Depression Inventory (CDI) • Self-Perception Profile for Children • Network of Relationships Inventory – parents and peers	• Negative interactions with parents mediated the relationship between perceived social competence at baseline and depressive symptoms at 10-week follow-up (37% of the association)

Appendix A

Summary of studies on children's social relationships - Continued

Source	Purpose of study	Sample	Method	Measures	Outcome
Levitt et al. (1993)	Study the social relationships of children at different ages, and their associations with social adjustment	• Students from one middle school and two feeder elementary schools in southeastern metropolitan area • N = 333 • Age = 7, 10, 14 • 45% male	• Cross-sectional survey • Individual interviews with children and questionnaires for teachers	• Children's Convoy Mapping Procedure – visual diagram to nominate close and important relationships, with questions to assess social support • Self-Concept Scale • 1-item measure of sociability and mood	• Each age group showed different patterns of social relationships • Total amount of social support and social support from the closest relationships were associated with self-concept and sociability/mood (effect sizes .02~.07)
Levitt et al. (2005)	Identify patterns of social support during transition from middle childhood to adolescence, and examine their impact on social adjustment	• Students from 8 public elementary schools in the southeast • N = 691 • Age = M 9.72 for younger cohort, M 11.7 for older cohort • 49% male	• Longitudinal survey with 2-year follow-up • Individual interview with children and questionnaires for teachers	• Children's Convoy Mapping Procedure • Harter Self-Perception Profile • Children's Loneliness Scale • Child Behavior Checklist Teacher Report Form	• Three patterns of social support – 1) support from close family and friends, 2) support from close and extended family, 3) support from close family alone • Children who received social support only from close family showed more internalizing behavioral problems at follow-up (effect size .02~.04)

Appendix A

Summary of studies on children's social relationships - Continued

Source	Purpose of study	Sample	Method	Measures	Outcome
Pettit et al. (2011)	Examine the relationship between specific domains of chronic stress and suicidal behaviors	• Consecutively admitted psychiatric inpatients who endorsed suicidal ideation / attempt in the past week • N = 131 (55 attempted suicide) • Age = M 15.02 • 30% male	• Cross-sectional survey • Individual interviews with adolescents	• Modified Scale for Suicide Ideation • Suicide Intent Scale • Chronic Stress and Episodic Life Events Interview for Adolescents – semi-structured interview that produces narratives about stress	• Among suicide attempters (n=55), interpersonal stress in close friendship and social life areas were associated with seriousness of intent
Popliger et al. (2009)	Investigate the relationship between perceived social support from family, friends, and teachers and behavioral adjustment of children with Emotional / Behavioral Difficulties (EBD)	• Children with EBD in 6 elementary schools in Canada • Teachers referred children for participation • N=54 • Age = M 8.57 • 80% male	• Cross-sectional survey • Individual survey interview with children, phone interview with parents, drop-off questionnaire for teachers	• Behavioral Assessment System for Children (BASC) • Children's Depression Inventory (CDI) • Self Perception Profile for Children (SPPC) • Survey of Children Social Support – Abbreviated Version (SOCSS-AV)	• Friend support predicted child emotional / behavioral functioning (effect size .19) • Teacher support predicted child emotional / academic functioning (effect size .19)

Appendix B

Researcher's form for social convoys

Person (Initial)	Relationship to child (e.g. Parent, friend)	Does this person provide a social support function? (Y/N)						Does this person provide a negative interaction function? (Y/N)		Lives in same facility? (S=staff, P=peer)
		Affective		Affirmation		Tangible aid		Conflict	Criticism	
		Q1	Q2	Q3	Q4	Q5	Q6	Q1	Q2	

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