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Patterns of Movement in Foster Care: An Optimal Matching Analysis

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Abstract

Placement instability remains a vexing problem for child welfare agencies across the country. This study uses child welfare administrative data to retrospectively follow the entire placement histories (birth to age 17.5) of 474 foster youth who reached the age of majority in the state of Illinois and to search for patterns in their movement through the child welfare system. Patterns are identified through optimal matching and hierarchical cluster analyses. Multiple logistic regression is used to analyze administrative and survey data in order to examine covariates related to patterns. Five distinct patterns of movement are differentiated: Late Movers, Settled with Kin, Community Care, Institutionalized, and Early Entry. These patterns suggest high but variable rates of movement. Implications for child welfare policy and service provision are discussed.

Studies of foster youth who reach the age of majority during foster care suggest that these youth face enormous challenges to becoming self-sufficient, including undereducation, unemployment, and homelessness, as well as high rates of poverty, incarceration, and revictimization (Festinger 1983; Barth 1990; McDonald et al. 1996; Courtney et al. 2001; Goerge et al. 2002; Needell et al. 2002; Reilly 2003; Courtney and Dworsky 2006; Courtney et al. 2007). High rates of troubling outcomes at the onset of transition to adulthood, when youth are expected to function independently, suggest the need to take a closer look at the experiences of youth during foster care and the services provided to prepare youth for the transition to adulthood (Courtney 2000). Important implications for child welfare policy and practice lie in understanding how substitute care contexts provide the protective scaffolding that places foster youth on developmental pathways toward self-sufficiency.

Unstable environments during foster care may exacerbate the negative prospects of foster youth. Studies of foster youth who reach the age of majority during foster care suggest that many go through an alarming number of placement changes (McMillen and Tucker 1999; Mech and Fung 1999; Needell et al. 2002), and a substantial portion spend time in residential care settings (Barth 1990; McMillen and Tucker 1999; Courtney et al. 2001; Needell et al. 2002; Courtney, Terao, and Bost 2004). Unplanned events and exits, such as running away, are also a frequent occurrence (McMillen and Tucker 1999; Courtney et al. 2001, 2004; Wulczyn and Hislop 2001).¹

¹Among studies of foster youth making the transition to adulthood, 11 report on general placement experiences in foster care (Festinger 1983; Barth 1990; Courtney and Barth 1996; McMillen and Tucker 1999; Mech and Fung 1999; Courtney et al. 2001, 2004; Wulczyn and Hislop 2001; Goerge et al. 2002; Needell et al. 2002; Pecora et al. 2006). A review of these studies suggests that there is wide variation in the timing and type of events that are reported. Studies differ, for instance, on whether placement into residential care is reported at any time (Festinger 1983; Barth 1990; Courtney et al. 2001; Goerge et al. 2002) or at discharge from foster care (Courtney and Barth 1996; Needell et al. 2002). In addition, unplanned events differ to the extent that they are reported at any time during child welfare system involvement (Courtney and Barth 1996; Courtney et al. 2001) or as an exit from the child welfare system (McMillen and Tucker 1999; Wulczyn and Hislop 2001). A lack of consistency across this collection of studies makes it a challenge to synthesize findings and identify prevalence rates.

Although research does not reveal how frequent changes in placements shape the ability of foster youth to function on their own during the transition to adulthood, there are good reasons to believe that unstable environments in foster care have negative consequences during that transition. The time given to achieving financial independence as an adult has lengthened and has become more complex and less uniform (Settersten 2005). Families are increasingly called on to support young adults during an extended transition (Furstenberg, Rumbaut, and Settersten 2005). One important consequence of foster placement instability may be the lack of adult guidance during the transition. Placement into care and placement instability may disrupt a youth's relationships with extended family and other adults who might provide needed resources. Disruptions to relationships and contexts may ultimately prevent the youth from building supportive networks that he or she can draw on during the transition.

Very little is presently known about the placement experiences of foster youth who reach the age of majority during child welfare system involvement. The number of foster youth who reach the age of majority each year constitutes less than 5 percent of the child welfare population (Wulczyn 2009). Youth who age out of foster care represent one extreme end of the distribution of all children receiving child welfare services. As an extreme case, the common characteristics of youth, such as their older age at entry into the child welfare system (Courtney and Hughes Heuring 2005; Wulczyn, Chen, and Hislop 2007), frequent changes in placements (Courtney et al. 2001; Needell et al. 2002), and multiple entries into the child welfare system (McMillen and Tucker 1999), may render youth unsuitable for inclusion into studies examining placement instability (Usher, Randolph, and Gogan 1999; Wulczyn, Kogan, and Harden 2003; James, Landsverk, and Slymen 2004). In the existing, albeit few, studies on placement instability, limitations in the ways that movement is conceptualized and measured lead to the tendency to view placement changes as a static and neutral backdrop for the unfolding of foster children's lives. Yet physical and social environments are deeply implicated in patterns of opportunity and constraint (Kemp, Whittaker, and Tracey 1997); it therefore is critical to view child welfare systems as dynamic social structures (Zinn 2009).

One promising approach for placing movement into broader context is to examine common movement trajectories or patterns in placement changes over the length of time youth are placed in foster care (Usher et al. 1999; Wulczyn et al. 2003; James et al. 2004). An emphasis on trajectories suggests that single events are better understood in their continuity rather than in isolation (Elder 1998). By viewing the entire sequence of placement events as they unfold through real time and space, this approach allows one to consider the effects of historical events on the life course. For the current study, there are two important events in the history of child welfare: child welfare caseloads began to increase dramatically in the mid-1980s (Wulczyn and Hislop 2003), and subsequent policy reforms shifted child welfare's focus away from family preservation to child safety and permanence (McGowan and Walsh 2000; Stein 2003). To move youth through and out of the child welfare system, the Adoption and Safe Families Act of 1997 (U.S. Public Law 105-89) promoted strict time lines for termination of parental rights and challenged states to increase adoptions and guardianships (Pecora et al. 2000). Illinois and other states with high caseloads used innovative performance contracting initiatives and guardianship demonstration projects to cut the number of youth on caseloads by over half (Blackstone, Buck, and Hakim 2004; Testa and Miller 2005). Yet even with these creative responses, the system struggles to achieve permanence for teenagers, children with emotional and behavioral problems, and other difficult cases (Smith 2003). In many states, the system continues to identify long-term foster care as a goal for foster youth (Lowry 2004).

Another shift in the field of child welfare is reflected in dramatic changes to the delivery of mental health services for troubled youth and their families. Since the early 1980s, the field has moved away from the use of costly restrictive-care settings that congregate troubled youth, shifting toward a community-based approach that provides comprehensive care to youth and their families in their communities (Duchnowski, Kutash, and Friedman 2002). Yet it remains unclear whether this framework for a community system of care effectively meets the needs of maltreated foster youth who are deflected away from residential care settings. In states that use gatekeeping requirements to make residential care a last resort, there has been an increase in the number of placements that youth must go through before they receive intensive services, and there is little indication that preventative services are used to circumvent placement into deep-end care (Budde et al. 2004). Child welfare research does not commonly examine how these shifting policy developments and practice approaches relate to child welfare service provision. Focusing on the extreme case of youth who reach the age of majority during foster placement may help illuminate some of this complexity and set forth greater theoretical understanding of the role of broader contexts in shaping the pathways taken through the child welfare system.

The goal of this article is to build on the existing research on movement in foster care and patterns in placement changes. In the study of these placement histories, two empirical concerns emerge. First, do patterns exist in the foster care placement changes of youth who reach the age of majority in foster care, and if the patterns do exist, what are those patterns? Second, if such patterns exist, what individual, family, and child welfare characteristics are associated with them? These questions demand a focus that considers the entire sequence of placement changes. The ongoing and sequential nature of the events that define placement instability introduces a substantial potential for bias in the analysis. Variable-based research assumes that effects exist independent of context or separately from the values of the other causal variables in each case (Blair-Loy 1999). Because there is no reason to assume that the effects of each placement move are linear and independent of one another, it is essential to use methods that do not make these assumptions.

In addition to the substantive questions posed, a broader aim of this article is to use optimal matching (OM), a new method in social work research. This method enables analyses to capture complex, recurring sequences of events over time (Sankoff and Kruskal 1983; Abbott 1995). The analyses thus examine the entire history of placement changes, as opposed to a count of placement changes. A handful of studies in child welfare demonstrate that movement in foster care unfolds in highly patterned and structured ways (Usher et al. 1999; Wulczyn et al. 2003; James et al. 2004). An ideal method for seeking similarities among lengthy sequences, OM allows this study to extend previous research by examining the contours taken through foster care by a heterogeneous sample of youth who reach the age of majority in one state child welfare system.

This study is intended to contribute basic knowledge about one of the most vexing problems facing child welfare agencies. Since the mid-1990s, child welfare class-action litigation has occurred in well over half of all states, and 10 consent decrees specifically seek to minimize high rates of movement among youth in foster care (Kosanovich and Joseph 2005). Among youth in foster care for short periods of time, the rate of movement generally meets national standards for ensuring foster placement stability; however, these standards often are not met for youth who remain on caseloads for extended periods of time (U.S. Department of Health and Human Services 2006).² A review of the literature on placement instability reveals the difficulty of arriving at a precise list of the factors associated with placement movement and

²Few children spend their entire childhoods in the child welfare system, and youth who age out of foster care are not an exception (Wulczyn 2009).

instability. Studies in the area of placement instability are few, and, among this collection, findings are mixed. Behavioral problems, for instance, are often the most common reason given for placement moves (Zinn et al. 2006), but if analyses consider agency policies, behavior-related moves are found to make up a small percentage of moves (James 2004). Studies examining placement instability's relations with adult outcomes additionally suffer from methodological limitations, such as failing to account for selection effects and omitted variable bias (Zimmerman 1982; Festinger 1983; Needell et al. 2002). The limited knowledge in this area precludes the development and implementation of interventions aimed at preventing instability.

Identifying the common pathways taken through the child welfare system is the first step in describing the phenomenon of placement movement. Identification and description of the commonly occurring sequences of placement experiences may enable the construction of hypotheses to test the antecedents and consequences of movement. The current study does not seek to examine how movement is related to outcomes during the transition to adulthood or how changing policy developments affects child welfare service provision, but it does attempt to identify common placement histories for a population of youth selected because of their status as aging-out foster youth. It thus is the first among many steps needed to understand the effects of early placement experiences on later ones and the dynamic ways that personal and social conditions interact to shape individual possibility.

Method

Sample and Data

The current analyses examine 474 individual placement histories of foster youth who reach the age of majority in the state of Illinois. These 474 foster youth were selected because of their participation in the Midwest Study of the Adult Functioning of Former Foster Youth (hereafter referred to as the Midwest study), a longitudinal study that follows foster youth in three states (Illinois, Wisconsin, and Iowa) as they make the transition to adulthood (Courtney et al. 2004). The first wave of data in the Midwest study was collected between May 2002 and March 2003 from 732 youth who were between the ages of 17 and 18. All sampled youth entered foster care before their sixteenth birthday, and the primary reason indicated for placement into foster care is child maltreatment or dependency (i.e., neglect). Youth are ineligible to participate in the Midwest study if they have a developmental disability, were incarcerated, or were placed in a psychiatric hospital at any point during the survey field period (May 2002 through March 2003). Youth also are ineligible if they have a serious mental illness that makes it impossible for them to complete the interview. Excluding youth placed in psychiatric hospitals during the field period results in a higher-functioning sample, but the high rate of placement in psychiatric settings suggests that a fair percentage of youth in this sample struggled with mental health or health problems during their time in foster care.

Of the 581 youth who were randomly selected from the original sample frame in the state of Illinois, 83 were determined to be ineligible due to physical or emotional limitations, runaway or missing status, placement out of state, or incarceration. Of the remaining 498 youth who met inclusion criteria, an additional 24 were not interviewed because of caregiver refusal, youth refusal, lack of contact with the youth, or an unknown eligibility status. The final analytic sample includes 474 youth and represents 67 percent of the overall population of youth who met the sample criteria. The overall response rate is 95 percent.

Among the records in each of the three states, placement event records from the Illinois Department of Children and Family Services (DCFS) are the only records that the author determined to be reliable and complete. Records of placement events are drawn from the

Child and Youth Centered Information System (CYCIS), which is connected to the sample of Illinois youth in the Midwest study. This integrated database follows youth continually from foster care entry to exit. It has been managed since 1984 by Chapin Hall, an independent policy research center at the University of Chicago. It is one of the most well-established and reliable child welfare data systems in the country.

The observation period in this study is from the 1984 fiscal year through the 2003 fiscal year. The sampled foster youth were born between May 1984 and June 1985. They were placed into foster care at different ages (entry age ranges from birth to age 16). As a consequence, the length of each foster care spell varies considerably. This study includes all sampled youth's spells in foster care from birth to age 17.5.³ Entry into foster care is counted only after a child is placed out of his or her biological caregiver's home and into a substitute care placement. An age cutoff of 17.5 years is used because, across states, the vast majority of youth are discharged at age 18 (Dworsky and Havlicek 2008). In Illinois, youth are eligible for discharge from foster care at the age of 18 but may elect to remain in foster care up to age 21. If they are enrolled in college, they may remain in care up to age 23.

Optimal Matching

This study uses OM to uncover patterns of movement across changes in placement settings. Optimal matching is a subset of sequence methods that originated in the biological sciences as a way to study DNA sequences (Sankoff and Kruskal 1983). Andrew Abbott and John Forrest (1986) use OM to investigate patterns of solidarity in rural, nineteenth-century England. Recent research uses it to study a wide range of phenomena in anthropology and sociology. For example, studies use OM to investigate mental health service use (Wuerker 1996), the career patterns of executive women (Blair-Loy 1999), and the structure of lynching in the South (Stovel 2001). Recent methodological developments seek to address some of the initial criticism of the original work (Aisenbrey and Fasang 2010).⁴

Optimal matching is a heuristic device designed to probe social processes rather than a probabilistic method that measures the importance of variables (Blair-Loy 1999). In event history and survival analyses, a sequence is probabilistically generated from point to point. By contrast, OM treats an entire sequence of data points as the unit of analysis. Optimal matching makes no assumptions about the distributional properties of events or the causal mechanisms underlying the sequential patterns of action. Rather, OM directly calculates dissimilarity between two sequences, given a matrix of dissimilarity between sequence elements (Abbott 1990). There are, nevertheless, good reasons to limit the use of OM to studying processes that are highly structured (Stovel and Bolan 2004). Because OM has not been widely used in social work research, the "Data Analysis" section provides a general overview and describes the actual steps taken to run OM.

Optimal matching is the first step in the sequence analysis; OM algorithms are used to calculate a measure of resemblance for each pair of sequences in a data set. The basic OM algorithm is known as the Needleman-Wunsch algorithm (MacIndoe and Abbott 2004). For any number of sequences (N), the total number of pairwise distances calculated by the OM algorithm is equal to $[N(N-1)]/2$.⁵ To calculate the resemblance between two sequences, OM uses a series of basic operations called substitutions (or replacements) and insertions or deletions (or indels; Abbot and Hrycak 1990). These operations determine the distance between all pairs of sequences. Because there are limitless ways to turn one sequence into

³In total, there were 637 entries for this sample of 474 youth.

⁴For a review of this criticism and a discussion of the limitations of OM, please see the exchange among Abbott (2000), Levine (2000), and Wu (2000).

⁵In the current study, the total number of pairwise distances is 112, 101.

another, the overall goal of OM is to calculate the most efficient way to make one sequence resemble another. The distance between any two sequences is the minimal sum of the costs of the arithmetic operations required to turn one sequence into the other. This distance is referred to as the Levenshtein distance (MacIndoe and Abbott 2004).

Substitution costs are the costs of swapping one event for another in a case where there are two different events in a pair of sequences that are aligned (Abbott and Tsay 2000). If two sequences are aligned, indels are the costs associated with adding or subtracting an event from one sequence to make it resemble the other in a case where an event is present in one sequence but not in the other. The costs assigned by the analyst are typically based on theoretical criteria and can involve complex designs (Blair-Loy 1999; Stovel 2001). Once the pairwise distances between the sequences are calculated using the elementary operations described above, a distance matrix is created. This matrix is composed of all of the pairwise distances between the sequences and is used as input in the next step, which employs a clustering or multidimensional scaling program to find common groupings in the data.

Measures

Placement Events and Categories for OM Analyses

To remove duplicate placements from the data, the analyses in this study require precise information about the date (or dates) of entry, type of placement event, start and end dates of placement events, and provider information. The data capture 42 types of placement events. Placement events range from an event that indicates a regular foster home to an event identifying the youth's whereabouts as unknown. The author relies on knowledge of placement settings (gathered during work with one state child welfare agency), DCFS policy guides from the state of Illinois, consultation with a handful of child welfare researchers who have used the DCFS data, and guidance from one caseworker at the DCFS. Knowledge from these sources was employed to recode the 42 placement events into seven broad placement categories: (1) Not in Care, (2) Relative Care, (3) Regular Foster Care, (4) Treatment Foster Care, (5) Congregate Care, (6) Unplanned Events, and (7) Run or Unknown Events. Table 1 defines these placement categories.

Covariates Associated with Patterns of Movement

Multiple sources provide the data used to examine covariates associated with movement patterns. These sources include survey data from the Midwest study and administrative data from the DCFS. The information collected in CYCIS is for administrative purposes, but the Midwest study instead focuses on collecting information about services and youth functioning at the onset of the transition to adulthood. One limitation of this study is therefore the lack of detailed information about the child, family, and case context that leads up to entry into the child welfare system.

Gender—Information about gender comes from the Midwest study. A dichotomous variable indicates whether a respondent is male or female.

Race and ethnicity—Race and ethnicity variables come from the Midwest study. A series of dummy variables are created; white respondents compose the reference category. A dichotomous variable also indicates whether a respondent is of Hispanic ethnicity or not.

Maltreatment history—Abuse information is drawn from the Midwest study and CYCIS. The Life Experiences Questionnaire (Rose, Abramson, and Kaupie 2000) was administered at wave 1 of the Midwest study. Youth were asked 16 questions about the physical abuse and neglect they experienced.⁶ Nine of these questions are related to neglect; the remaining

questions investigate physical abuse by caregivers. Because respondents may have physical abuse or neglect experiences that are not specified in the Life Experiences Questionnaire, this study also uses a CYCIS data variable that reports on the administrative reason for opening a child welfare case. There were 42 possible reasons for opening a child welfare case. Both of these sources of information (16 questions in the Midwest study and 42 reasons for case opening in CYCIS) are used to create one dichotomous variable that indicates Any Physical Abuse if one or both sources of information suggest that any such abuse occurred. Another dichotomous variable indicates Any Neglect if one or both sources suggest that the youth experienced neglect or dependence.

Parent problems—Two questions from the Midwest study examine whether the foster youth lived with a biological caregiver before entry into foster care and, if he or she did, whether the caregiver had any of eight problems: alcohol abuse, drug abuse, mental illness, mental retardation, inadequate parenting problems, domestic violence, criminal behavior, and other problems. A handful of studies examine placement instability's relations with specific parenting problems of a biological caregiver (Pardeck 1984; Cooper, Petersen, and Meier 1987; Farmer, Lipscombe, and Moyers 2005; Zinn et al. 2006). Several studies suggest that parental substance abuse is related to placement instability (Pardeck 1984; Cooper et al. 1987), but more recent work suggests that children placed closer to their families of origin, no matter what the source of the parental problem may be, are less likely to experience placement instability (Zinn et al. 2006). Because study findings do not provide strong evidence for the relationship between placement instability and any one parent problem, the responses are summed into a continuous variable that reflects the number of caregiver problems. However, the frequency distribution of this variable suggests that it is skewed to the right; the mean (1.88 on a scale of 0–6) is slightly higher than the median (1.50 on a scale of 0–6). To address this problem, the count of caregiver problems is transformed by taking the natural log. Also, a dichotomous variable examines whether one or more of these caregiver problems is reported. The multivariate results from calculations using the log of the continuous variable are consistent with those in estimates that use the dichotomous variable. The dichotomous variable is used in the multivariate analyses to aid in interpretation.

Agency location—Administrative data provide the location of the supervising agency at the youth's first entry into foster care. This location is used to determine the region where services originated, and region is measured by six possible categories. Because the majority of sampled youth are from urban regions, a dichotomous variable indicates whether services originated in an urban or other region.

Caseworker characteristics—These characteristics come from the CYCIS data, which contain information about educational achievement. There has been a movement away from employment of professionally educated caseworkers in child welfare (Zlotnick 2002). To examine whether professional education makes a difference in movement patterns, a dichotomous variable indicates the first caseworker's educational achievement, which is measured as having (1) a graduate education or higher or (2) an undergraduate or high school education.

Data Analysis

The first step in this study's OM analysis involves recoding all possible placement events into the categories described above. Several coding strategies are developed and tested.

⁶At wave 1 of the Midwest study, institutional review board concerns prevented the inclusion of questions concerning sexual abuse.

Consistent with the findings reported by another study that uses OM (Forrest and Abbott 1990), divergent coding schemes are found to have a weak effect on the final analyses. Next, several different timing variables are tested. A month timing variable is found to be practical and to lose the least amount of placement information. In each sequence, the month timing variable is used to separate the period from birth to age 17.5 into 209 months. The data are rearranged so that each month in the period from birth to age 17.5 corresponds with a placement event (4,323 placement events for 474 youth are converted to 99,066 placement event-months; i.e., 474 cases $\times$ 209 months). The data include a large number of placement events that are short in duration. The data identify 1,394 placements that lasted less than 30.5 days. These placements account for nearly one-third of all placement events in the data (32.2 percent). An indicator variable is used to capture information about placements that last less than 1 month. This enables the study to identify any month with two or more placement changes. These High Turnover months are then added to the seven placement categories to create a total of eight placement categories.

The next step involves determining the costs needed to turn one sequence into another. There is little theory to draw from in determining the cost of changing placements in foster care, so the used adjustments are relatively straightforward. Because the OM model is not constructed to account for the number of placement changes (it follows the change in restriction over time), two cost adjustments are made based on the theoretical level of restriction across placements. First, one assigns the extra cost of moving from one setting to another that is more restrictive. The Restrictiveness of Living Environments Scale measures the restrictiveness of substitute care settings, examining the limits placed on freedom of movement by rules and the conditions of entry and departure (Hawkins et al. 1992).⁷ Next, the elements of the substitution-cost matrix are calculated by taking the absolute value of the difference between the mean levels of restriction of two placement settings and dividing that difference by the average restriction across the two placement settings.

The second cost adjustment involves the cost of an indel relative to a substitution. In an earlier step, each of the individual placement sequences is turned into the same length (209 months). Standardizing sequence length ensures that the length of the foster care spell (or spells) does not become the main determinant of similarity (Abbott and Tsay 2000). A high indel cost relative to the substitution cost has the potential to coerce the OM alignment algorithms (MacIndoe and Abbott 2004). If sequences are set to equal length and an indel is set to any cost greater than half of the largest substitution cost, an indel will never be used by the algorithm in calculating the pairwise distances. The OM literature (Blair-Loy 1999; MacIndoe and Abbott 2004) suggests that, for most applications in which alignments of similar but separate portions of sequences are desired, setting an indel to the vicinity of 0.1 times the largest substitution cost picks up sequence regularities. The indel (0.1) is multiplied by the highest substitution cost (1.8). In this study, the highest cost occurs when a transition is made from a Run or Unknown Events category to an Unplanned Events category. The final indel cost inserted into the STATA program is 0.2 (or $0.1 \times 1.8 = 0.18$).

The OM is implemented in STATA with a user-written program (Brzinsky-Fay, Kohler, and Luniak 2006). The final variables in the data set include a case identification variable, a time (months) variable, and the placement category variable (event). Once the dissimilarity matrix is generated in STATA, several hierarchical agglomerative clustering methods are tested. These methods include single, average, complete, and Ward's linkage methods. The Ward's linkage method is the only hierarchical agglomerative clustering method that resulted in more than two groupings. To create common groupings, the Ward's method joins the two groups that result in the minimum increase in the error sum of squares. Clustering

⁷This scale ranges from 0.5 to 10.0 and ranks 25 residential environments from Independent Living by Self (0.5) to Jail (10.0).

graphs, stopping rules, and visual inspection of sequence index plots are used to determine the optimal number of clusters. Studies employing OM differ in the approaches used to ascertain structuring within data. The majority of studies rely on an external criteria or probabilistic validation and theoretical interpretability (Abbott and Forest 1986; Wuerker 1996; Blair-Loy 1999; Stovel 2001; Mc-Allister, Kuang, and Lennon 2010). In the current study, the Calinski-Harabasz pseudo- F index and the Duda-Hart Je (2)/Je (1) index suggest that a four- to eight-cluster solution fits the data best. Relative improvement of the mean within-group distance and the mean between-group distance ratio identifies that a five-cluster solution fits the data best. The next section presents descriptive statistics for each pattern category, F -values for tests of independence, and results of a Bonferroni post hoc procedure to assess statistically significant pairwise comparisons.

Multinomial logistic regression is used to investigate the factors related to each of the patterns. Because the overall interval for each pattern extends from birth to age 17.5, the covariates are not measured before the start of the interval (gender, race, and ethnicity are exceptions). Since OM defines several patterns of group membership, multinomial logistic regression examines how covariates are associated with membership in the OM groups.

As in logistic regression, no assumptions are made about the distributions of covariates. They do not have to be normally distributed, linearly related, or of equal variance within groups. Covariates can also be discrete or continuous. Multinomial logistic regression seeks to determine the probability of an outcome relative to another that is represented by the dependent variable. Results are expressed in terms of an odds ratio. Odds ratios are formulated for all but one category, which becomes the reference group. These analyses are conducted with SPSS software.

Findings

Table 2 provides frequencies for each placement event in the data and identifies the placement events that fall into each of the placement categories. In total, the sample of 474 foster youth experienced 4,323 placement events during the observation period. Once events are combined into broad placement categories, Regular Foster Care is estimated to be the most common placement setting experienced by youth in this sample. Youth in this setting make up just over 25 percent of all placement events. The next most common placement setting is Congregate Care, which is estimated to represent 23 percent of all events. Together, Unplanned Events and Run or Unknown Events are estimated to make up 15 percent of all events in the data.

Table 3 provides a description of the event-months. Consistent with findings from other studies of young people who reach the age of majority during foster placement (McMillen and Tucker 1999; Wulczyn and Hislop 2001; Wulczyn 2009), estimates suggest that this sample of youth spent the vast majority of childhood, from birth to age 17.5, out of the child welfare system.

Description of Full-Sample Placement Experiences

Table 4 presents descriptive statistics on the placement experiences for the full sample. Length of time in foster care is estimated to range from just under 1 year (0.73) to 17.5 years in care. The average length of time in care is 7.8 years. The total number of placements per youth ranges from one to 39. The average number of placements is 8.3. To calculate the rate of movement over time, the total number of placements is divided by the total length of time in care. The time in a Run or Unknown Events category is excluded from the length of time in the child welfare system in the above calculation of the rate of movement. On average, foster youth in this sample are estimated to move 1.3 times per year. The rate of movement

among males is found to differ to a statistically significant degree from that among females ($F = 20.83$; $df = 472$; $p = .000$). The rate of movement is estimated to be greater among females than among males.

Orientation to Patterns of Movement

Cluster analyses of the distances from the OM analysis indicate that there are several distinct pathways through the child welfare system. Five substantively interesting clusters emerge in the data.⁸ The Late Movers pattern includes 134 youth and represents 28 percent of the sample. These youth spend the least amount of time in the child welfare system (as shown below). The Settled with Kin pattern represents the second-largest pattern and contains 118 youth, or approximately one-quarter of the sample. The next two patterns are almost identical in both composition and length of time in care. The Community Care pattern is made up of 81 foster youth and represents 17 percent of the total sample. They are estimated to spend the majority of time moving in and out of Regular Foster Care settings (as shown below). The Institutionalized pattern is composed of 77 youth, or 16 percent of the total sample. The Early Entry pattern includes only 64 youth, or 13.5 percent of the total sample. Appendix A provides a summary of the patterns.

Comparisons across Patterns of Movement

Table 5 displays the descriptive statistics for each pattern category. It also presents F -values for tests of independence and results of a Bonferroni post hoc procedure to assess statistically significant pairwise comparisons. Statistically significant contrasts are identified in the rightmost column, and coding for the contrasts is presented in the table's note. The contrasts identify statistically significant differences between Late Movers and each of the other patterns. For example, contrast A identifies a statistically significant difference between the Late Movers pattern and the Settled with Kin pattern ($p < .05$). Contrast B identifies a statistically significant difference between the Late Movers pattern and the Community Care pattern.

The youth in the Late Movers pattern are characterized by their age at entry (they are estimated to be older than youth in other patterns), time in care (their tenure is the shortest), and rate of movement (the highest among the patterns). On average, youth in the Late Movers pattern are estimated to first enter foster care at age 11.9 and to spend 3.4 years in care. The rate of movement in this pattern is estimated to be 2.2 moves per year. This is the highest rate among all patterns, and it is statistically significantly different from the rates for all other patterns. During the short time in foster care, these youth are estimated to spend almost equal lengths of time, on average, in Relative Care (10.4 months), Congregate Care (10.3 months), and Regular Foster Care (9.9 months). This finding suggests that foster youth in this pattern do not settle into any one placement setting.

Conversely, the Settled with Kin pattern is distinguished by placement with relatives, moderate length of time in care, and the lowest rate of movement among all patterns. Compared with youth in the other pattern categories, foster youth in this pattern are estimated to spend the longest length of time in relative placements. In fact, the estimated length of stay with relatives is over twice as long for these youth as for counterparts in any other pattern. Youth in the Settled with Kin pattern are also estimated to experience the lowest rate of movement (0.6 moves per year). Some shifting among relatives and infrequent

⁸Figure B1, presented in app. B (available in the online edition of the *Social Service Review*), provides a graphical display of the individual sequences by cluster, using a sequence index plot generated by STATA. Time in months is located along the X -axis. The number of individual placement histories can be found along the Y -axis. Placement categories are color coded in the legend found in the upper right-hand corner. As can be seen, the plot illuminates the complexity of the pathways taken through foster care and helps distinguish five patterns of movement.

movement across other placement settings is nonetheless observed. For instance, the estimated average number of placements for this pattern is 4.7, and the estimated average number of relative placements is 2.9. Compared with youth in the other patterns, youth in the Settled with Kin pattern are also estimated to spend the least amount of time in Congregate Care settings (1.2 months, on average) and to have the fewest number of Unplanned Events.

The Community Care pattern is characterized by placement in Regular Foster Care settings and by the second-highest rate of movement. However, the rate of movement is not statistically different from that of the Institutionalized pattern explained below. Youth in the Community Care pattern are found to first enter foster care at age 7.5 and to spend an average of 8.5 years in foster care. During this time, they are estimated to experience 11 different placements and to move, on average, 1.4 times per year. They are estimated to spend the majority of their time in Regular Foster Care (44.1 months), Relative Care (26.5 months), and Treatment Foster Care settings (16.6 months). Although Regular Foster Care is estimated to be the predominant placement type for youth in this pattern, the results suggest that the youth experience movement across several types of placement settings. Next to youth in the Settled with Kin pattern, those in the Community Care pattern are estimated to spend the second-least amount of time in Congregate Care settings (8.1 months, on average).

The Institutionalized pattern represents youth who are estimated to spend the majority of their time in Congregate Care settings (63.2 months, or over 5 years). This is more than three times as long as the estimated time that youth in any of the other patterns spend in Congregate Care settings. Youth in the Institutionalized pattern are first placed into care, on average, at age 6.7. They are estimated to spend 9.5 years in foster care. The rate of movement for these youth is estimated to be 1.2 changes per year. The rate is not as high as that found for the Late Movers pattern and is lower than that for the Community Care pattern. This suggests that Congregate Care settings may play a stabilizing role, but lateral movement across Congregate Care settings is observed. The descriptive statistics presented in table 5 also suggest that Relative Care is the next predominant placement type in this pattern. These youth are estimated to spend 31.3 months with kin. It is interesting to note that youth in the Institutionalized pattern are estimated to spend very little time in Regular Foster Care (4.1 months on average) or Treatment Foster Care (9.3 months on average). This suggests that caseworkers may not explore other preventative interventions or perhaps that such interventions were not available prior to placement into Congregate Care. Across all of the patterns, the Institutionalized group is found to spend the longest time in the Unplanned Events category (approximately 2.3 months, on average).

The Early Entry pattern is marked by the longest time spent in foster care. On average, youth in this pattern are estimated to enter foster care at age 3.4 and to spend 13 years in care, so the pattern's relatively low rate of movement is surprising. On average, these youth are estimated to move 0.8 times per year. This is the second-lowest rate of movement across the pattern categories, and it is not statistically different from the movement rate estimated for the Settled with Kin pattern. Yet because of the time that youth in this pattern spend in the child welfare system, the pattern's movement rate reflects just under one change per year for the 13 years in care. These youth are found to spend the longest time in Regular Foster Care settings (66.9 months), although they also are estimated to spend considerable time in Treatment Foster Care (61.7 months) and Congregate Care (17.4 months). The relatively small amount of time spent in Relative Care (7.7 months) also differentiates the Early Entry group from the other patterns. On average, youth in the Early Entry group are estimated to spend less time in Relative Care than are youth in the Late Movers group, who are found to spend the least amount of time in the child welfare system.

Predictors of Patterns

In addition to identifying the patterns of placement changes, this study explores how individual, family, and child welfare characteristics are associated with the categories that describe patterns of movement. Bivariate analyses identify differences in these relations across pattern categories. Given the limitations of the data, it is important to use caution when interpreting these findings, as the estimated relations may reflect artifacts of other omitted variables. Table 6 displays the descriptive statistics for each pattern and the results of chi-square analyses.

To examine each pattern's relations with individual, family, and child welfare characteristics, the analyses compare the results for the Settled with Kin pattern to those for the Late Movers, Community Care, Institutionalized, and Early Entry patterns. The Settled with Kin pattern is selected as the reference group because it is estimated to have the lowest rate of movement in foster care. Table 7 provides the results of the multinomial logistic regression analyses.

Results from the multinomial logistic regression suggest that several factors are related to pattern membership. Being male increases the estimated odds of being in the Institutionalized pattern and the Early Entry pattern. Compared to youth in the Settled with Kin pattern, those in the Institutionalized pattern are estimated to be 2.8 times more likely to be male. Youth in the Early Entry pattern are found to be 2.0 times more likely. Race also is estimated to be statistically significantly related to pattern categories. Being African American increases the estimated odds of being in the Settled with Kin category compared to all other pattern categories.

Living with a biological caregiver before entry into foster care is not found to be related to any of the patterns. However, having a biological caregiver who had one or more parenting problems is estimated to be positively and statistically associated with being in the Early Entry pattern or in the Community Care pattern. For example, youth who had a biological caregiver with any of these problems are found to be 2.1 times more likely to be in the Community Care pattern than in the Settled with Kin pattern. They are estimated to be 2.5 times more likely to be in the Early Entry pattern than in the Settled with Kin pattern.

Estimates in table 7 suggest that child maltreatment is not related to any of the pattern categories. In fact, the estimated odds of experiencing physical abuse are about the same across all but the Community Care pattern. The same is true of the estimates for neglect, which is found to increase the odds of being in the Community Care pattern, but this relation is not statistically significant.

Results from the multinomial logistic regression suggest that a number of child welfare factors are statistically related to pattern membership. Having a caseworker with a graduate education or more decreases the odds of being in the Community Care pattern compared to those of being in the Settled with Kin pattern by 63 percent and decreases the odds of being in the Institutionalized pattern compared to those of being in the Settled with Kin pattern by 55 percent. It is important to interpret this finding cautiously. Other omitted variables may be responsible for this observed relation. If the first child welfare services are received in the urban county, the estimated odds of being in the Institutionalized pattern are greater than the odds of being in the Settled with Kin pattern. Youth who enter the system in the urban county are estimated to be 3.5 times more likely to be in the Institutionalized pattern than in the Settled with Kin pattern.

Discussion

This is the first study to directly examine variation and variability in the placement experiences of foster youth who reach the age of majority during foster placement. Rather than providing a snapshot of youth experiences in the child welfare system, the study introduces a new and exploratory method to capture the entire sequence of placement changes and to search for common patterns of movement. Consistent with previous research (Usher et al. 1999; James et al. 2004; Wulczyn et al. 2003) indicating that foster youth move through the child welfare system in patterned ways, the current findings suggest that the placement movement of this highly heterogeneous sample can also be distilled into a finite set of movement patterns. Nevertheless, the limits of this study's findings and the interpretations based on those findings should be considered carefully.

Perhaps the single most important reason to use caution in generalizing this study's findings has to do with sampling bias caused by left-censoring in longitudinal studies that are not based on entry cohorts. Because this study relies on a convenience sample of cases that reached the age of majority in the child welfare system, the findings in no way reflect the experiences of the vast majority of children or adolescents who come to the attention of child welfare authorities (Wulczyn 2009). The preferred approach for summarizing patterns of placement experiences for all foster children would be to use cohorts of children entering foster care over some extended period of time (Wulczyn 1996). Another reason to use caution in generalizing this study's findings is that the process of placement changes in the state of Illinois may differ in substantive ways from that occurring elsewhere. Illinois has a long history of allowing youth to remain in the child welfare system past the age of majority. As such, placement experiences, particularly around the onset of the transition to adulthood, may look quite different from those of foster youth in states that discharge youth closer to the age of majority. For instance, youth in other states may be more likely to be stepped down from a residential setting before reaching the age of majority; they may be stepped down simply because they are unable to remain in the child welfare system and alternative arrangements are necessary. The caseload dynamics in this state over the past 3 decades additionally suggest the need to use caution in generalizing findings to foster youth who are making the transition to adulthood in other states. Illinois saw a dramatic increase in its child welfare caseload. The number of foster children increased nationally by 19 percent between 1990 and 1995; by comparison, the number of Illinois foster children increased by over 130 percent (Children's Defense Fund 1998). Almost half of these children were under the age of 5. In 1995, DCFS was the most frequently named defendant in federal lawsuits (National Center for Youth Law 1995). There are many good reasons to believe that these dynamics could be associated with differential patterns of movement in foster care.

Additional caveats concern the methods, coding, and cost decisions. The analyst's decisions about coding, the value of indels, and replacement costs heavily influence OM. Although this study draws on multiple sources in making such decisions, others may come to different conclusions. For example, one such decision is the choice to standardize sequence length by turning each sequence into an equal length that ranges from birth to age 17.5. This decision limits any meaningful exploration of the covariates associated with different pathways through care. The findings suggest that the only true predictors of these patterns, for example, are gender, race, and ethnicity. The other information was collected during the placement interval. The benefits gained from this decision, however, include the ability to place movement into a broad developmental and historical context. With these considerations in mind, several findings warrant further discussion.

The finding that youth in the largest pattern encountered the greatest turbulence is alarming, as adolescents compose the second-largest population (behind infants) of youth currently

entering the child welfare system (Wulczyn et al. 2005). Unlike the youth in other patterns of movement, those in the Late Movers pattern entered the foster care system well after the system's population reached an all-time high in 1997. They entered foster care during a period of extensive child welfare reforms, which include efforts to decrease time to reunification, monitor performance, increase the use of adoptions, and expand the use of guardianships.

The data in this study cannot explain why youth who spend the least amount of time in foster care (those in the Late Movers pattern) also experience the highest rate of movement, but a few speculations can be made. The increasing use of short-term congregate care settings may provide one explanation. Since 1990, the average number of placement changes has increased, and some attribute these changes to a dramatic shift in the type of placements provided during the first year of placement (Zinn et al. 2006). In Illinois, fewer youth experience first placements with relatives, and more experience first placements in temporary shelter settings (Zinn et al. 2006). A decrease in the percentage of youth placed into relative foster homes would likely increase the number of movements, because relative care settings are typically associated with greater stability than other substitute care settings. So too, increases in the number of youth placed into short-term settings would likely be associated with increases in movement into other permanent placement settings, since these by definition are not intended to be long lasting.

Entering foster care during the teenage years may have developmental implications, such that rates of movement in foster care may be higher for older children. Teens can be expected to have substantial bonds with their biological caregivers and may not benefit from permanency options that move to swiftly terminate parental rights. The age of these youth may enable them to exercise individual agency in ways that younger children cannot. They may run away from placements, voice concerns about their circumstances to professionals, and attempt to influence the decisions that are made about them. Such actions may contribute to movement through foster care. Their age may also make relationships with substitute caregivers complex and challenging to navigate. It may be difficult to find foster parents who are willing to take in teenage youth, and the pool of foster family homes available for teens may be smaller than that for young children. If the number of foster homes willing to take teens is limited, those limits may drive growth in the use of short-term congregate care settings. The finding of such a high rate of movement suggests that intensive efforts may be required to recruit, train, and support substitute caregivers who are willing to care for teens. The finding also suggests that there is a need to develop permanency options that reflect the special relationship these young people have with their biological families.

The study also finds that the second-largest pattern, Settled with Kin, is marked by long and steady stretches of time spent in kinship care placements. This conflicts with findings that youth who reach the age of majority during foster placement are less likely than younger foster children to be placed with relatives (Barth 1990; Wulczyn and Hislop 2001). The finding from the current study may reflect policy developments and administrative changes unique to the state of Illinois. Those developments dramatically increased the use of relative foster caregivers during the early 1990s (Gleeson 1996; Testa et al. 1996).⁹ The finding of movement that is observed within the Settled with Kin pattern is consistent with results in other studies: the stability of placements declines as time in relative care grows (Leslie et al.

⁹Testa et al. (1996) argue that state preference for kinship care, the absence of clear limits on the number of unlicensed homes, and the implementation of separate approval processes for relatives set in motion a series of administrative changes that ultimately increased kinship care in the child welfare system.

2000; Terling-Watt 2001). In other words, increased efforts are required to support placements with extended families.

Although the Community Care and the Institutionalized patterns together make up only one-third of the sample, they account for a sizable percentage of placement changes. This and the lack of clear indication for a gradual increase in restriction over time suggest the need to reexamine child welfare services provided for high-risk youth. Although the Community Care pattern appears to represent youth who spend the majority of time placed in family-like settings, youth in this pattern also experience the second-highest rate of movement. One explanation for this high rate of movement may be that these youth have unidentified mental health needs or perhaps do not demonstrate a level of need sufficient to warrant specialized services in treatment or residential care. Gatekeeping procedures put in place to make residential treatment a last resort may deflect these youth from residential treatment settings (Lyons et al. 1998). An alternative explanation may be that foster care settings are the predominant placement and that parents receive little effective training to address the emotional and behavioral needs of maltreated youth (Dorsey et al. 2008).

Conversely, the long length of time spent in congregate care settings and lateral movement within the Institutional pattern raise additional concerns about child welfare service provision for high-risk youth and their families. In some ways, this pattern is puzzling. The state implemented gatekeeping requirements to prevent long stays and lateral movement across residential settings. The Institutionalized pattern may therefore represent deeply troubled youth. Evidence suggests that as some youth are deflected from residential care to other settings, the population in residential care becomes increasingly composed of youth who exhibit serious emotional and behavioral problems (Budde et al. 2004). Even so, the lack of gradual movement toward therapeutic or residential settings suggests that gaps may exist in the preventative services provided to troubled youth and their families. There are good reasons to believe that long stays in highly restrictive settings may cast a long shadow over these young people during the transition to adulthood.

The finding that the Early Entry pattern experienced the second-lowest rate of movement is surprising because the youth in this pattern spend the greatest amount of time in foster care. One explanation for the low rate of movement may be early placement in Treatment Foster Care settings. This pattern is consistent with research that suggests that youth placed in treatment homes are statistically significantly less likely to experience placement moves than are youth in traditional foster care placements (Price et al. 2008). However, it is difficult to say with any certainty how closely treatment foster care settings in Illinois resemble the rigorously tested Multidimensional Treatment Foster Care model (Chamberlain 2002). Regardless of the similarities between these models, professionalized caregivers may be less likely to become permanent caregivers to youth who are younger and have a greater chance of being adopted (Dorsey et al. 2008).

Although unmeasured phenomena prevent this study from addressing reasons for the different pathways taken through the foster care system, the high rate of movement observed in each of the patterns is nonetheless troubling. Regardless of whether these youth come into the child welfare system with substantial needs that contribute to patterns of movement or whether system dynamics are to blame, the distinction is likely arbitrary from the perspective of youth and families. High rates of placement instability and haphazard movement across placement settings call for a reexamination of the quality of care provided to foster youth who are not permanently reunified with their families or placed with alternative permanent families. These features also suggest the need to reexamine the decisions that are made about their developmental needs.

This study is also interested in examining child, family, and child welfare factors related to pattern membership. In many ways, these findings are consistent with the literature on movement in the child welfare system and perhaps help validate the theorized patterns of movement. For instance, the estimated odds of being male are greater in the Institutionalized pattern than in the Settled with Kin pattern. Given study limitations, it will be important to examine factors that predict pathways with greater precision than this study can offer.

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Appendix A

Table A1

Summary of Optimal Matching Patterns

Pattern	<i>n</i>	Description
Late Movers	134	Highest rate of movement; shortest time in foster care; no pre-dominant placement; high rate of unplanned events
Settled with Kin	118	Lowest rate of movement; moderate time in foster care; pre-dominant placement with kin; movement within kin care
Community Care	81	Second-highest rate of movement; foster care is predominant setting; low placement rate in congregate care
Institutionalized	77	Third-highest rate of movement; predominant placement is congregate care; preventative placement is not evident; high rate of unplanned events
Early Entry	64	Second-lowest rate of movement; longest time in foster care; foster and treatment care are predominant; little time spent with relatives

Table 1**Definition of Seven Broad Placement Categories**

Placement Category	Description
1. Not in Care	Any time spent in a biological parent home or any permanent placement such as an adoptive home or a subsidized guardianship. State-supervised, in-home placements with biological parents are not counted as a formal placement.
2. Relative Care	Any placement with a biological relative. States have considerable flexibility in defining kin for the purposes of foster care policy (Leos-Urbel, Bess, and Geen 1999). In Illinois, only those related by blood marriage or adoption are considered to be kin.
3. Regular Foster Care	Care in one of two types of foster homes: (1) regular boarding homes, which are supervised by the state child welfare agency, and (2) private agency homes, which are supervised by outside agencies that are contracted by the state child welfare agency. In the absence of any indication of difference, this study considers placements in both types of homes to be in the same category.
4. Treatment Foster Care	Care by professional caregivers with specialized training. Caregivers provide support to youth with high-level emotional, behavioral, developmental, or health needs.
5. Congregate Care	Any institutional setting (e.g., a group home, residential treatment center, or congregate care setting). The term “congregate care” refers to any facility that provides 24-hour care to a group of youth that is supervised by unrelated adults who work in shifts (Barth 2002, 32).
6. Unplanned Events	Events that are not technically foster placements but include care in locked facilities deemed necessary to stabilize foster youth who are at risk of harming themselves or others or who exhibit serious problems. This category includes any psychiatric hospitalization as well as placement in a detention center or juvenile lockup facility.
7. Run or Unknown Events	Any event that indicates a youth has run away from placement or any placement that is identified as unknown or missing. These events are not technically foster placements, but they occur with sufficient frequency in the data to require their own category.

Table 2Categories of Placement events and Frequencies of Placement Events ($N = 4,323$)

Placement Category and Event	<i>n</i>	%
Not in Care:		
Home of parent	105	2.4
Foster home adoption	1	.02
Subsidized guardianship	8	.19
Delegated relative authority	<u>3</u>	<u>.07</u>
Total	117	2.7
Relative Care:		
Relative	<u>850</u>	<u>19.7</u>
Total	850	19.7
Regular Foster Care:		
Foster care boarding	615	14.2
Foster private agency	<u>503</u>	<u>11.6</u>
Total	1,118	25.8
Treatment Foster Care:		
Specialized foster care	514	11.9
Treatment foster care	<u>84</u>	<u>1.9</u>
Total	598	13.8
Congregate Care:		
Group care	182	4.2
Institution: DCFS	99	2.3
Institution: private child care facility	645	14.9
Institution: Illinois Department of Mental Health	32	.7
Institution: rehabilitation services	11	.2
Independent living	19	.4
Transitional living placement	<u>3</u>	<u>.1</u>
Total	992	22.9
Unplanned Events:		
Detention	94	2.2
Institution: Illinois Department of Corrections	37	.8
Hospital or health facility	<u>114</u>	<u>2.6</u>
Total	245	5.7
Run or Unknown Events:		
Runaway	254	5.9
Youth whereabouts unknown	40	.9
Youth missing	3	.1
Other	<u>107</u>	<u>2.5</u>
Total	404	9.3

Note.—DCFS = Illinois Department of Children and Family Services.

Table 3

Approximate Number of Months within Each Placement Category

Placement Category	Months	%
Not in Care	55,140	55.7
Relative Care	17,049	17.2
Regular Foster Care	9,950	10.0
Treatment Foster Care	6,911	7.0
Congregate Care	8,155	8.2
Unplanned Events	555	.5
Run or Unknown Events	548	.5
High Turnover	706	.7
Total	99,066	

Table 4

Descriptive Statistics for Placement Patterns of Full Sample

Experience in Foster Care	Male (<i>n</i> = 218)		Female (<i>n</i> = 256)		Total (<i>n</i> = 474)	
	Mean	SD	Mean	SD	Mean	SD
First entry age (0–16 years)	7.9	4.0	8.5	4.6	8.2	4.3
No. of reentries into foster care (0–5)	.2	.6	.3	.7	.3	.6
Length of time in care (.73–16 years)	8.2	3.8	7.3	4.0	7.8	3.9
Placement length (months):						
Relative Care (0–205)	33.2	42.7	38.3	41.3	36.0	42.0
Regular Foster Care (0–187)	19.7	31.7	22.1	36.9	21.0	34.6
Treatment Foster Care (0–169)	17.3	32.9	12.3	25.2	14.5	29.0
Congregate Care (0–131)	23.6	31.2	11.8	21.1	17.2	26.9
Unplanned Events (0–40)	2.0	5.9	.6	2.6	1.3	4.5
Run or Unknown Events (0–44)	1.2	3.3	1.1	3.2	1.2	1.6
Total no. of placement events (0–39):	8.5	6.2	8.1	5.9	8.3	6.1
Relative Care (0–10)	1.4	1.5	1.8	1.9	1.8	1.8
Regular Foster Care (0–16)	2.1	2.6	2.3	2.6	2.4	2.8
Treatment Foster Care (0–20)	1.3	2.5	1.1	2.3	1.3	2.4
Congregate Care (0–17)	2.4	2.7	1.7	2.5	2.1	2.7
Unplanned Events (0–7)	.6	1.1	.5	1.1	.5	1.1
Run or Unknown Events (0–10)	.8	1.6	.8	1.4	.8	1.5
Rate of movement (.7–8.6)	1.1	.8	1.4	1.4	1.3	1.1
No. of placement types (2–8)	4.5	1.6	4.3	1.6	4.4	1.6

Table 5
Average Comparisons Across the Optimal Matching Patterns on Placement Domains

Placement Domain	Pattern										F-Test	Significant Contrast (S)
	Late Movers (n = 134)		Settled with Kin (n = 118)		Community Care (n = 81)		Institutionalized (n = 77)		Early Entry (n = 64)			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Age at first entry	11.9	3.7	8.0	3.1	7.5	3.7	6.7	3.1	3.4	2.6	79.9***	A, B, C, D, G, I, J
Years in care	3.4	1.5	8.2	3.1	8.5	2.9	9.5	2.4	13.0	2.5	194.2***	A, B, C, D, E, F, I, J
Rate of movement	2.2	1.5	.6	.6	1.4	.9	1.2	.6	.8	.5	42.1***	A, B, C, D, E, F, I
Mean no. of placements:	7.0	5.0	4.7	3.9	10.8	6.7	11.1	5.5	10.1	6.9	27.1***	A, B, C, D, E, F, G
Mean no. in Relative Care	1.3	1.4	2.9	1.9	1.9	1.9	1.8	1.6	.8	1.1	24.3***	A, B, E, F, G, I, J
Mean no. in Regular Foster Care	2.2	2.4	.7	1.2	4.6	3.4	1.6	1.7	3.9	3.1	39.1***	A, B, D, E, G, H, J
Mean no. in Treatment Foster Care	.8	1.7	.2	.5	1.7	2.3	1.6	2.6	3.4	3.9	23.8***	D, E, F, G, I, J
Mean no. in Congregate Care	2.1	2.5	.6	1.2	1.8	2.3	4.7	3.1	1.9	2.7	35.6***	A, B, C, D, E, F, H, I, J
Mean no. in Unplanned Events	.6	1.4	.1	.6	.5	1.1	.9	1.1	.5	.9	6.7***	A, F
Mean no. in Run or Unknown Events	.7	1.3	.4	1.1	1.0	1.7	.9	1.1	.7	1.7	5.7***	C, E, F
Mean no. of reentries	.3	.7	.3	.6	.4	.5	.3	.5	.3	.9	.4	
Length of placement type (months):												
Relative Care	10.4	13.3	90.0	35.0	26.5	32.1	31.3	33.2	7.7	14.1	167.4***	A, B, C, E, F, G, I, J
Regular Foster Care	9.9	13.2	3.8	7.7	44.1	28.2	4.1	7.0	66.9	58.6	93.9***	B, D, E, G, H, I, J
Treatment Foster Care	6.1	11.6	.7	3.1	16.6	22.2	9.3	16.0	61.7	48.0	93.2***	B, D, E, G, I, J
Congregate Care	10.3	14.0	1.2	2.8	8.1	12.4	63.2	16.0	17.4	26.2	179.3***	A, C, E, F, G, H, I, J
Unplanned Events	1.8	6.1	.4	2.3	1.4	5.2	2.3	4.6	.5	1.1	3.2*	F
Run or Unknown Events	1.9	6.1	1.3	3.9	2.2	6.4	1.1	2.8	.8	2.3	2.4	B
No. of placement types (2–8)	4.2	1.4	3.3	1.4	5.1	1.5	5.3	1.4	4.7	1.3	33.6***	A, B, C, E, F, G
First placement:												
Length (days)	186.5	338.1	1,244.2	1,491.9	244.8	513.3	388.7	706.1	253.3	619.3	30.0***	A, E, F, G
Type:												

Placement Domain	Pattern									
	Late Movers (<i>n</i> = 134)		Settled with Kin (<i>n</i> = 118)		Community Care (<i>n</i> = 81)		Institutionalized (<i>n</i> = 77)		Early Entry (<i>n</i> = 64)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
No. in Relative Care	43	(32.1)	89	(75.4)	19	(25.5)	30	(39.0)	10	(15.6)
No. in Regular Foster Care	45	(33.6)	13	(11.0)	40	(49.4)	22	(28.6)	31	(48.4)
No. in Treatment Foster Care	7	(5.2)	2	(1.7)	3	(3.7)	1	(1.3)	4	(6.3)
No. in Congregate Care	37	(27.6)	9	(7.6)	15	(18.5)	21	(27.3)	12	(18.8)
No. in Unplanned Events	2	(1.5)	5	(4.2)	4	(4.9)	3	(3.9)	7	(10.9)

Note.—Unless otherwise noted, results are presented as means and standard deviations (SDs); percentages are presented in parentheses. Chi-square for the first placement type is 130.3 and is statistically significant at $p < .001$. Contrasts: A = 1:2; B = 1:3; C = 1:4; D = 1:5; E = 2:3; F = 2:4; G = 2:5; H = 3:4; I = 3:5; J = 4:5.

* $p < .05$.

*** $p < .001$.

Table 6

Descriptive Statistics of Each Pattern Category Across Domains in Multivariate Model ($N = 474$)

	Late Movers ($n = 134$)	Settled with Kin ($n = 118$)	Community Care ($n = 81$)	Institutionalized ($n = 77$)	Early Entry ($n = 64$)	χ^2
Individual:						
Gender:						16.13**
Female	60.4	61.9	54.3	36.4	46.9	
Male	39.6	38.1	45.7	63.6	53.1	
Race:						69.59***
African American	47	93.2	71.6	62.3	78.1	
White	36.6	3.4	21	22.1	15.6	
Other	16.4	3.4	7.4	15.6	6.3	
Ethnicity:						.38
Hispanic	5.2	7.6	6.2	14.3	6.2	
Child maltreatment:						
Physical abuse	56	39	34.6	55.8	54.7	16.15**
Neglect	76.1	61.9	65.4	72.7	73.4	7.52
None or unknown	19.4	33.1	30.9	24.7	21.9	7.72
Family:						
Biological family:						
Living with parent	85.1	78.8	80.2	80.5	78.1	2.19
Any caregiver problem	66.7	58.1	77.3	66.1	81.8	11.9*
System:						
Education of first caseworker:						
Graduate degree or higher	34.3	32.2	17.3	22.1	23.4	25.45**
Undergraduate degree or less	65.7	67.8	82.7	77.9	76.6	
Region:						
Urban	38.8	70.9	63	76.6	59.4	40.03***
Nonurban	61.2	29.1	37	23.4	40.6	

*
 $p < .05$.**
 $p < .01$.

 $p < .001$

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Table 7

Multinomial Logistic Regression

	Late movers		Community Care		Institutionalized		Early Entry	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Prior to foster care:								
Individual:								
Gender:								
Male (ref. is female)	1.16	.65–2.04	1.42	.78–2.59	2.76**	1.50–5.18	1.97*	1.01–3.72
Race (ref. is white):								
African American	.06***	.02–.19	.10**	.03–.35	.05***	.01–.19	.22*	.06–.79
Other	1.60	.27–9.69	.70	.09–4.93	.87	.13–5.83	.83	.10–6.88
Ethnicity (ref. is not Hispanic):								
Hispanic	.12**	.03–.55	.32	.07–1.48	.44	.11–1.79	.44	.09–2.17
Child maltreatment:								
Neglected (ref. is not neglected)	1.47	.75–2.89	1.13	.57–2.25	1.30	.60–2.80	1.21	.56–2.62
Physically abused (ref. is not abused)	1.18	.63–2.18	.61	.31–1.20	1.67	.82–3.39	1.41	.70–2.84
Family:								
Lived with biological caregiver (ref. is lived with other caregiver)	1.25	.58–2.67	.79	.35–1.75	1.07	.50–2.46	.66	.30–1.39
Any caregiver problem	1.05	.55–1.98	2.13*	1.03–4.41	1.04	.51–2.11	2.50*	1.13–5.52
At first entry:								
Education of first caseworker:								
Undergraduate education or less (ref.)								
Graduate education or higher	.83	.44–1.50	.37**	.18–.77	.45*	.21–.95	.66	.28–1.21
Region at first entry:								
Nonurban (ref.)								
Urban	.71	.39–1.32	1.30	.65–2.60	3.55**	1.56–8.07	.89	.48–2.04

Note.—ref. = reference category; CI = confidence interval.

*
 $p < .05$.**
 $p < .01$.

 $p < .001$

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