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Youth Subgroups who Receive John F. Chafee Foster Care Independence Program Services

Ka Ho Brian Chor[1] · Hanno Petras[2] · Alfred G. Pérez[3]

Abstract
To date over two billion dollars have been invested in the John F. Chafee Foster Care Independence Program (CFCIP) to help youth who are transitioning out of foster care to achieve self-sufficiency through an array of independent living services. Although states are required to report CFCIP service provision to the National Youth in Transition Database (NYTD), the degree of heterogeneity of the aging out population from the service receipt perspective and state implementation is unknown. The CFCIP calls for a deeper understanding of the underlying patterns of services receipt to prepare for youth's successful transition to adulthood. Based on the population of 68,057 first-time youth who received CFCIP services in FY2011-FY2013 from the NYTD, we used multi-level latent class analysis (MLCA) to identify underlying combinations of service receipt that may be influenced by youth-level and state-level characteristics. We identified the most preferred model based on interpretability, fit statistics, and split-half replication. The optimal model was a three-class, MLCA solution characterized by a high-service receipt profile, an independent living assessment and academic support receipt profile, and a limited service receipt profile. Among male and female youth, age, education level, and whether states serve youth aged 18 or above were significant characteristics associated with LCA profile membership. States could benefit from understanding existing service receipt patterns and gaps to optimize decisions on service delivery in order to meet youth needs and to identify specific services that may prepare youth aging out of foster care towards positive outcomes.

Keywords Foster care · Transitional age youth · Aging out of care · Independent living services · Latent class analysis · Child welfare policy

Introduction

Every year, hundreds of millions of federal dollars are invested in the John F. Chafee Foster Care Independence Program (CFCIP) to help youth who are transitioning out of foster care to achieve self-sufficiency through an array of independent living services (Okpych 2015). While this population is often viewed as homogeneous, this assumption has not been adequately tested in extant research as states continue to develop state-specific policy and service planning for the aging out population (Keller et al. 2007; Shpiegel and Ocasio 2015). Little is known about the heterogeneity of the aging out population, the types of independent living services received, and how services cluster to help youth transition into adulthood. To better characterize the heterogeneity of the aging out population, a long-term research strategy should first begin by exploring the evidence base for heterogeneity in independent living service receipt in a representative aging out population. This initial research needs to be established before the field can address subsequent questions about service disparity, service needs, and service impact on youth outcomes.

Between 8–11% of foster care youth, or 20,000–25,000 youth, aged out of care every year and were emancipated from the system into adulthood on their own (U.S. Department of Health and Human Services 2016a), culminating in at least 285,000 such youth who were not able to

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✉ Ka Ho Brian Chor
bchor@chapinhall.org

[1] Chapin Hall at the University of Chicago, Chicago, IL, USA

[2] American Institutes for Research, Washington, DC, USA

[3] California State University Stanislaus, Turlock, CA, USA

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achieve legal permanency in the past 10 years. Over 30 years of research has documented the outcomes and challenges of this population, including homelessness, diminished education opportunities, economic hardship due to unemployment and financial instability, unplanned parenthood, involvement with the justice system, as well as substance abuse and mental health problems (Cook 1994; Festinger 1983; Jones 2014; Lee et al. 2012; Reilly 2003; Shpiegel and Cascardi 2015). Anticipating this high-need population, in 1985 the U.S. government amended Title IV-E of the Social Security Act to establish the Independent Living Program (ILP; P.L. 99–272), which authorized states to develop and offer practical skill-building services such as budgeting, nutrition, financial management, finding and maintaining employment and housing, to foster care youth aged 16–18 whose permanency goals became unattainable and therefore would age out of care (Jones 2014). Subsequently the Foster Care Independence Act of 1999 (FCIA; P.L. 106–169) made further changes to the Title IV-E of the Social Security Act and established the John H. Chafee Foster Care Independence Program (CFCIP).

The CFCIP legislation mandates that states serve youth who are likely to remain in foster care until the upper age limit of foster care eligibility, youth who are on the verge of aging out of care, and youth who have aged out of care to complement their efforts to achieve self-sufficiency and transition from adolescence to adulthood (P.L. 106–169). Partly due to insufficient monitoring and evaluation of state provision of the ILP despite over a decade of ILP implementation (U.S. General Accounting Office 1999), states are required to document the type and quantity of CFCIP services provided to eligible youth (U.S. Department of Health and Human Services 2017). Nevertheless, the CFCIP is a voluntary program that only serves eligible youth who actively and willingly desire to participate in the program. According to Section "3.1 F Independent Living, Certifications and Requirements, Objective Eligibility Criteria" of the Children's Bureau Child Welfare Policy Manual, each state must ensure that "youth participate directly in designing their own program activities that prepare them for independent living and that the youth accept personal responsibility for living up to their part of the program. If a youth is unwilling to participate or accept personal responsibility, he/she cannot receive services" (U.S. Department of Health and Human Services 2017).

Youth enrollment in CFCIP services depends on the unique eligibility and service delivery criteria described in each state's Child and Family Service Plan that is submitted by the state and approved by the federal government. This state discretion introduces variability in CFCIP implementation. Experience of youth aging out of care varies by state, which reflects differences in state laws on foster care eligibility and services and supports while youth are in foster care and as they age out (Congressional Research Service 2016; Dworsky and Havlicek 2009). Increasingly more states are extending foster care eligibility beyond age 18, which directly impacts CFCIP eligibility (National Conference of State Legislatures 2015). States also use different administrative structures to deploy independent living services, whether through a state independent living office, county administrators with support from the state, or partnerships with private organizations to fund and administer services; states may further use different strategies to involve youth in participating in CFCIP services such as annual conferences, youth advisory boards, or peer youth recruitment (Congressional Research Service 2016). While each state receives differential funding proportional to the state's foster care population size, some states spend additional funds beyond the federal match to provide CFCIP services and other states use their own funds to provide services above and beyond CFCIP funding (Dworsky and Havlicek 2009).

Inherent in the intent of the CFCIP legislation and state mandates is an acknowledgment that one service mold does not fit all for the aging out population, that the aging out population may have developmental variability, and that it is important to document the differential provision of CFCIP services by type and quantity to better serve and further understand this population. In contrast, research on the degree of heterogeneity of the aging out population is at a nascent stage (Keller et al. 2007; Shpiegel and Ocasio 2015). Potential oversight of the multidimensional nature of the aging out population could mean that a greater number and more diverse types of well-intended CFCIP services may not necessarily fit the service profile of every youth who is aging out of care. When states have capped funding for CFCIP services, it is also impossible and unfeasible to provide all available independent living services to all eligible youth at all times (Jones 2014).

Two types of studies explore the characteristics of the aging out population. First, there is a growing body of recent research that examines youth subgroups with similar characteristics and experiences within the aging out population. Common subgroup themes across studies emerged. Shpiegel and Ocasio (2015) used a national sample to identify five subgroups defined by youth strengths, vulnerabilities, and child welfare experiences: (1) a resilient, high-functioning group, (2) a substance abuse subgroup, (3) a maladaptive functioning group, (4) an incarceration subgroup, and (5) a homeless subgroup. In the Midwest Study of former foster care youth, four subgroups were identified based on self-report outcomes including living arrangement, educational attainment, employment status, having children, and criminal records: (1) a higher education, stable living subgroup, (2) a struggling parent subgroup, (3) a lower education, high employment subgroup, (4) an emerging adult subgroup navigating independent living, and (5) an incarceration, homeless, and residentially mobile subgroup

(Courtney et al. 2010). Yates and Grey (2012) focused on functioning patterns among aged out foster youth in California: (1) a well-rounded, high-functioning subgroup, (2) a psychologically resilient subgroup, (3) an externally resilient subgroup with poor psychological health, and (4) a maladaptive functioning subgroup.

The second type of studies used a more conventional variable-oriented approach to describe characteristics of the aging out population or to identify predictors that were associated with outcomes of interest. Through interviews with foster care youth ages 17 through 21, the Midwest Study found perceived unmet needs for independent living services that were compounded by mental health issues and availability of social supports (Courtney et al. 2004; Katz and Courtney 2015). The California Youth Transitions to Adulthood Study included longitudinal surveys and interviews with youth and showed that the majority of re-surveyed youth opted to leverage extended foster care to help them reach their life goals, remain enrolled in school, and receive overall more supportive services (Courtney et al. 2014). Further, predictive models identified length of stay in care and prior service receipt to be consistent predictors of self-reported service receipt (Courtney et al. 2011).

The missing link in these two types of studies described above is a focus on the heterogeneity of the aging out population from the perspective of types of independent living services received. This research angle is important to examine considering state discretion and variability in defining eligibility for and provision of CFCIP services shape youth's transition out of care. The above studies collectively unveiled ways in which the aging out population itself can be differentiated by life experiences, case characteristics, and select outcomes, though none of them focused on the underlying variation of the full array of CFCIP services offered nationally to eligible youth. Furthermore, existing studies of independent living services for this population have focused on specific states, regions, or a subset of independent living services (Courtney et al. 2014; Courtney et al. 2004).

A foundation study by Okpych (2015) began to characterize the aging out population from the perspective of service provision and associated youth and state characteristics, based on the National Youth in Transition Database (NYTD) service data (FY2011 and FY2012). Among 131,204 service eligible youth, only 50.2% received CFCIP services; of the 13 CFCIP services examined, the top six most frequently received services were family support/marriage education, budget and financial management, health education and risk prevention, housing education and home management, career preparation, and postsecondary education support. While female youth received more services than male youth, African American youth received the least services. Overall, youth received on average 4–5 services. Between-state differences revealed over 62% of the states serving at least half of the eligible youth. Other regional differences in service type and service quantity indicated youth in large metropolitan areas received fewer types of services; youth in less densely populated areas receive more types of services; and youth in less urban areas were more likely to receive the most service types than the overall average. The descriptive study findings by Okpych (2015) provided a glimpse into the observed differences in service receipt that could further benefit from a deeper examination of the underlying heterogeneity of how services cluster, and how youth and state-level characteristics are associated with different youth subgroups of service clusters.

Although simple counting of service receipt or expert grouping of services are intuitively understandable and have been described by Okpych (2015), these methods may mask hidden combinations of services that have not been explored in the literature. First, we do not know how the different types of CFCIP services relate to each other in service provision when not all CFCIP services are the same and when different subgroups of youth may receive different service arrays. According to the Conceptual Framework for Transition to Adulthood for Youth in Foster Care, a youth's path to independence may include formal participation in independent living programs, other skill and competency-building programs, and informal supports from a youth's family and community (McDaniel et al. 2014). Yet it is unclear which service types or service combinations youth tend to receive, which may help guide future evaluation of independent living services to promote positive youth outcomes (McDaniel et al. 2014). It is prudent to identify receipt of independent living services as an agent of change, as the CFCIP intends, that may help explain how these youth functioning profiles are shaped.

Building on regional studies using latent class analyses on the aging out population and the descriptive study by Okpych (2015) using service receipt data, the purpose of this study was to adopt a multi-level analytic approach to uncover underlying subgroups of youth based on patterns across indicators of service receipt recorded and submitted by states. Identifying underlying service profiles of these youth subgroups can illustrate which service types are likely to co-occur to characterize the served population (i.e., not all youth are the same) and to tailor independent living services to the served population (i.e., not all services are the same). Towards these goals, this study used multi-level latent class analysis to account for the clustering of youth (Level 1) by state (Level 2), as state child welfare jurisdictions vary in their design and use of CFCIP services. We hypothesized that, given the initial evidence of heterogeneity of the aging out population identified in the CFCIP legislation and in the literature, there would be distinct subgroups of youth based on service receipt patterns that would further characterize this heterogeneity.

Table 1 Sample characteristics, by gender and split-half sample[a]

	Male						*p*	Female						*p*
	Total ($n = 35,028$)		First split-half sample ($n = 17,514$)		Second split-half sample ($n = 17,514$)			Total ($n = 33,029$)		First split-half sample ($n = 16,515$)		Second split-half sample ($n = 16,514$)		
	n	%	*n*	%	*n*	%		*n*	%	*n*	%	*n*	%	
Age							n.s.							n.s.
<18 years old	22,009	62.8	10,953	62.5	11,056	63.1		19,730	59.7	9828	59.5	9902	60.0	
≥18 years old	13,019	37.2	6561	37.5	6458	36.9		13,299	40.3	6687	40.5	6612	40.0	
Ethnicity							n.s.							n.s.
African American	10,330	29.5	5103	29.1	5227	29.8		9,539	28.9	4766	28.9	4773	28.9	
Caucasian	14,270	40.7	7133	40.8	7137	40.8		13,611	41.2	6832	41.4	6779	41.1	
Hispanic	6960	19.9	3508	20.0	3452	19.7		6,279	19.0	3139	19.0	3140	19.0	
Other/missing	3468	9.9	1770	10.1	1698	9.7		3,600	10.9	1778	10.7	1822	11.0	
Education level							n.s.							n.s.
≤8th grade	7791	22.2	3872	22.1	3919	22.4		6,804	20.6	3401	20.6	3403	20.6	
9th–12th Grade	21,156	60.4	10,510	60.0	10,646	60.8		19,982	60.5	9988	60.5	9994	60.5	
Post-secondary/college	1502	4.3	766	4.4	736	4.2		2,169	6.6	1085	6.6	1084	6.6	
Missing	4579	13.1	2366	13.5	2213	12.6		4,074	12.3	2041	12.3	2033	12.3	
Foster care status during reporting period							n.s.							n.s.
Yes (at some point)	24,299	69.4	12,189	69.6	12,110	69.1		22,445	68.0	11,210	67.9	11,235	68.0	
No	10,729	30.6	5325	30.4	5404	30.9		10,584	32.0	5305	32.1	5,279	32.0	
State FY10 foster care population							n.s.							n.s.
0–4999	5930	16.9	2984	17.0	2946	16.8		5,717	17.3	2849	17.3	2868	17.3	
5000–9999	12,221	34.9	6090	34.8	6131	35.0		11,147	33.8	5637	34.1	5,510	33.4	
≥10,000	16,877	48.2	8440	48.2	8437	48.2		16,156	48.9	8029	48.6	8136	49.3	
From state that serves youth age ≥ 18 years old							n.s.							n.s.
Yes	21,832	62.3	10,979	62.7	10,853	62.0		21,026	63.7	10,529	63.8	10,497	63.6	
No	13,196	37.7	6535	37.3	6661	38.0		12,003	36.3	5986	36.2	6017	36.4	
Child Welfare Administration structure							n.s.							n.s.
State-administered	20,119	57.4	10,043	57.3	10,076	57.5		19,807	60.0	9944	60.2	9863	59.7	
County-administered	13,894	39.7	6965	39.8	6929	39.6		12,231	37.0	6084	36.8	6147	37.2	
Hybrid	1015	2.9	506	2.9	509	2.9		991	3.0	487	3.0	504	3.1	
State-level Performance on FY10 CFSR permanency Composites							n.s.							n.s.
0–1 Composite above national standard	18,819	53.7	9455	54.0	9364	53.5		17.970	54.4	8970	54.3	9000	54.5	
2–4 Composites above national standard	16,209	46.3	8059	46.0	8150	46.5		15,059	45.6	7545	45.7	7514	45.5	

[a] n.s. = Not significant between first and second-split half samples

Method

Participants

In February 2008, the National Youth in Transition Database (NYTD), the federal data collection system for CFCIP services and outcomes, was created and states were required to begin data collection on 1 October 2010 (FY2011) and submit two types of data: (1) NYTD service data submitted every 6 months on independent living services for eligible youth (i.e., served population) paid for or provided by states through the CFCIP; and (2) NYTD outcome data on a cohort of served youth aged 17 through a survey administered by the states every 2 years to create baseline data at age 17 and follow-up data at ages 19 and 21, after which another cohort of youth aged 17 will be sampled (i.e., FY2011, FY2013, etc.).

In the FY2011-FY2013 NYTD service data, we identified 68,057 youth (male, $n = 35,028$; female, $n = 33,029$) in the reporting periods in which they first received CFCIP services. The rationale for this inclusion criterion is that the initial period of service eligibility and service receipt is the

most critical time when youth begin their transition out of foster care. Service patterns in this period need to be emphasized to bridge this first transitional gap. Also, youth who were only captured in one service period may represent a subset of transitional age youth with greater underlying needs for service detection and coordination. The inclusion criterion is also consistent with the study's focus on tailoring service provision based on existing service data. Issues and recommendations about eligible youth not receiving services are addressed by Okpych (2015). Due to variability in states' CFCIP eligibility criteria, youth's age ranged from 13 to 23 years old (mean = 17.6; standard deviation = 2.6) and 68.7% of the youth received foster care services or were in foster care during the reporting periods. The sample was somewhat evenly split between male (51.5%) and female (48.5%) female. The majority of the youth were Caucasian (41.0%), followed by African American (29.2%) and Hispanic (19.5%). At the time of initial service eligibility and service receipt, 5.4% had a post-secondary education or a college degree, 60.5% achieved a 9th–12th grade education, and 21.4% with less than a 9th grade education.

Table 1 summarizes the sample characteristics by gender and split-half sample. The split-half sampling approach is used for model building, selection and replication, which is described in greater detail in the section "Model building, selection, and replication." After the 68,057 youth were separated by gender (male, $n = 35{,}028$; female, $n = 33{,}029$), random split-half samples were generated within each gender group (male: first split-half, $n = 17{,}514$, second split-half, $n = 17{,}514$; female: first split-half, $n = 16{,}515$, second split-half, $n = 16{,}514$). Overall, the random split-half samples within each gender group were not statistically different regarding age, ethnicity, education level, foster care status, as well as other state-level characteristics (see Table 1).

Procedure

This study used the first 3 years of NYTD service data (FY2011–FY2013; 1 October 2010–30 September 2013) to identify foster care youth who were eligible for and received CFCIP services. All 50 states, including the District of Columbia and Puerto Rico, submit NYTD service data every 6 months on an ongoing basis. While the NYTD were designed to collect service data on the full population of eligible and served youth, there may be missing records of service receipt. For example, New York state did not report service receipt data in FY11–FY12 to the NYTD (Okpych 2015).

Measures

NYTD service data are cross-sectional, collected at six-month intervals, at the youth-level, and include demographic characteristics and, most importantly, 15 binary indicators of CFCIP services to indicate receipt or no receipt of service within a reporting period. These services are designed to be clearly distinct, discrete services that are paid for by CFCIP funds (National Data Archives on Child Abuse and Neglect 2016). Thematically, these 15 services fall into five broad domains: Financial assistance (supervised independent living, room and board, education, other); education services and supports (special education, academic support, post-secondary education support); career services and supports (career preparation, employment programs or vocational training); housing services and supports (independent living needs assessment, housing education and home management training, budget and financial management); and health and psychosocial education and supports (health education and risk prevention, family support and healthy marriage education, mentoring).

Data Analyses

Since youth are nested within states and states have authority over the provision of CFCIP services, we followed the multi-level latent model-building approaches as described and applied by Henry and Muthén (2010) and Vermunt (2003). Specifically, two types of latent models—latent class analysis (i.e., Level-1 only fixed effect model) and multi-level latent class analysis (i.e., Level 1 latent class solution at the youth-level is allowed to vary across Level 2 at the state-level)—were compared to identify the model that would be the most statistically fitting and interpretable to the observed service receipt data.

Latent class analysis

In this study, latent class analysis (LCA) was conducted to model the latent categorical nature of service receipt at the youth-level (hereafter the term "class" and "profile" are interchangeable). Specifically, LCA derived different patterns of service receipt into a small number of mutually exclusive latent profiles or subgroups of youth, with each profile demonstrating a distinct probability of endorsing each service (i.e., item probability) (Hagenaars and McCutcheon 2002; McCutcheon 1987). Thus, each youth was "assigned" to a specific latent profile based on their modal profile membership probability. Aggregated profile membership probabilities provide prevalence estimates for each profile. Between-profile differences were indicated by differences in probabilities in endorsing the observed service indicators.

Multi-level latent class analysis

Multi-level latent class analysis (MLCA), similar to a mixed-effects regression model for categorical outcome,

Table 2 Model results from using first split-half samples of male youth and female youth

Latent model	Male			Female		
	Log-likelihood	Number of estimated parameters	Bayesian information criteria (BIC)	Log-likelihood	Number of estimated parameters	Bayesian information criteria (BIC)
Latent class analysis (LCA)						
1-Class	−118021.96	15	236189.28	−112342.97	15	224830.54
2-Class	−106477.15	31	213254.70	−100726.71	31	201752.26
3-Class	−105522.91	47	211501.28	−99571.09	47	199595.27
4-Class	−104816.41	63	210243.32	−98839.50	63	198286.33
5-Class	−104202.41	79	209170.36	−98233.17	79	197227.92
6-Class	−103748.02	95	208416.63	−97822.34	95	196560.50
7 Class	−103458.80	111	207993.24	−97473.05	111	196016.17
Multi-level latent class analysis (MLCA)						
Level 1: 2-Class	−104982.50	32	210275.10	−99281.21	32	198870.91
Level 1: 3-Class	−102854.93	50	206194.39	−97358.76	50	195199.54

accounts for the nested structure of the observed data by modeling latent profile membership as random effects on Level 2. These random latent profile intercepts allow the probability of Level 1 latent profile membership to vary across Level 2 units; thus, MLCA examines Level 2 units' influence on Level 1 latent profiles (Henry and Muthén 2010). In this study, Level 1 units were youth and Level 2 units were states. The probabily that a youth would belong to a Level 1 latent profile could vary across states. Further, MLCA allows both individual covariates (Level 1) and contextual covariates (Level 2) to predict latent profile membership. Thus, two youth with the same Level 1 covariate (e.g., male) could differ in their probability of belonging to the same latent profile due to differences in state-level covariates (e.g., eligibility age for foster care).

Model building, selection, and replication

Model building consisted of the following steps. First, fixed-effect LCA models were estimated with increasing numbers of profiles. Random starts were applied to ensure models arrive at a global, rather than a local solution in fitting the observed data. Although, there are no standardized strategies to compare models with different number of profiles and factors (Nylund et al. 2007), Bayesian Information Criterion (BIC) served as the common index for model comparisons across the fixed-effect LCA and multilevel LCA models, with a lower score indicating better fit. Parsimony based on the number of parameters estimated per model and qualitative appraisal of the interpretability of profile plots were further considered to guide final model selection (Masyn et al. 2010). Preferred fixed effects models were selected based on fit indices, substantive interpretability, and parsimony. These models were then carried forward into the multi-level context.

All models were estimated separately for male and female youth given that gender differences were suggested in service receipt (Okpych 2015). To reduce Type I errors in generating profiles, random split-half samples were generated within each gender group: the first half was used to build, compare, and identify the preferred models; the second half was used to assess the degree of replication in profile prevalence as well as to assess differences in profile characteristics. Only 8.0–8.1% of the youth were missing data on each of the 15 indicators. Youth with missing data on all service indicators were excluded in model building, selection or replication (7.2%). The final first split-half samples at this stage were 16,162 male youth (92.3%) and 15,372 female youth (93.1%); the final second split-half samples were 16,212 male youth (92.6%) and 15,394 female youth (93.2%).

Using the second split-half samples for both gender groups, the preferred profiles were simultaneously regressed onto youth-level characteristics via multinomial logistic regression and state-level characteristics via linear regression. Data were modeled using two-level models (youth nested within state) in order to estimate correct standard errors as these two-level models parsed out level 2 variance from level 1 variance. Multiple sets of random starts were used to achieve global instead of local optimal solutions. All models were estimated in Mplus (Version 7.31) (Muthén and Muthén 1998–2012) using full-information maximum likelihood estimation, which is widely accepted as an appropriate way of handling missing data (Muthén and Shedden 1999; Schafer and Graham 2002). Full information maximum likelihood permits missing data under the

Table 3 Estimated profile prevalence and posterior probabilities from optimal model, by gender and split-half sample[a]

	Male						Female					
	Independent living assessment and academic support receipt profile		Limited service receipt profile		High-service receipt profile		Independent living assessment and academic support receipt profile		Limited service receipt profile		High-service receipt profile	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
Class Prevalence, *n* (%)	7926.0 (49.0%)	7823.4 (48.3%)	4455.3 (27.6%)	4511.6 (27.8%)	3789.7 (23.4%)	3877.0 (23.9%)	7310.9 (47.6%)	7541.0 (49.0%)	4578.4 (29.8%)	4396.1 (28.6%)	3482.7 (22.7%)	3456.9 (22.4%)
Item probability (from 0–1)												
1. Special education	0.24	0.25	0.16	0.17	0.29	0.30	0.15	0.15	0.09	0.09	0.18	0.18
2. Independent living needs assessment	**0.48**	**0.49**	0.16	0.16	**0.57**	**0.57**	**0.48**	**0.47**	0.13	0.15	**0.59**	**0.59**
3. Academic support	**0.42**	**0.41**	0.14	0.15	**0.71**	**0.71**	**0.37**	**0.36**	0.14	0.15	**0.65**	**0.66**
4. Post-secondary educational support	0.05	0.04	0.14	0.13	0.40	0.39	0.05	0.05	0.15	0.15	0.46	0.47
5. Career preparation	0.14	0.13	0.19	0.18	**0.77**	**0.76**	0.13	0.15	0.15	0.15	**0.75**	**0.76**
6. Employment programs or vocational training	0.09	0.08	0.05	0.06	0.43	0.42	0.06	0.06	0.04	0.05	0.40	0.39
7. Budget and financial management	0.11	0.11	0.05	0.04	**0.80**	**0.79**	0.12	0.11	0.05	0.06	**0.81**	**0.82**
8. Housing education and home management training	0.14	0.14	0.09	0.08	**0.77**	**0.76**	0.15	0.16	0.09	0.09	**0.79**	**0.79**
9. Health education and risk prevention	0.19	0.18	0.03	0.02	**0.81**	**0.81**	0.20	0.20	0.03	0.02	**0.81**	**0.82**
10. Family support and healthy marriage education	0.14	0.14	0.06	0.05	**0.63**	**0.62**	0.14	0.14	0.05	0.05	**0.67**	**0.67**
11. Mentoring	0.11	0.12	0.05	0.05	0.31	0.31	0.10	0.10	0.04	0.05	0.32	0.30
12. Supervised independent living	0.02	0.02	0.07	0.07	0.16	0.16	0.02	0.02	0.06	0.07	0.20	0.18
13. Room and board financial assistance	0.01	0.01	0.11	0.10	0.16	0.16	0.01	0.01	0.14	0.14	0.21	0.19
14. Education financial assistance	0.01	0.01	**0.22**	**0.24**	0.19	0.19	0.01	0.01	**0.30**	**0.29**	0.25	0.25
15. Other financial assistance	0.03	0.03	**0.33**	**0.32**	0.30	0.28	0.05	0.06	**0.33**	**0.34**	0.34	0.34

[a] Bold font indicates highest item probabilities within each latent class

assumption of missing at random, which means that the reason for the missing data is either random or random after accounting for other variables measured in the study (Arbuckle 1996; Little 1995). Although all models tested in this study allow missing data, youth missing data on all service indicators ($n = 4917$; 7.2%) were excluded from all analyses. Ninety nine percent of these youth were from New York state, which did not report any service receipt data but whose cases were nevertheless included in the NYTD (Okpych 2015). Among males with data on at least one CFCIP service indicator, 98.1% had complete data on all 15 CFCIP service indicators, 0.9% had 14 of the 15 indicators, and 0.01% had 13 of the 15 indicators. The bivariate data coverage ranged from 98.0–99.2%. Among females with data on at least one CFCIP service indicator, 98.3% had complete data on all 15 CFCIP service indicators, 0.9% had 14 of the 15 indicators, and 0.01% had 13 of the 15 indicators. The bivariate data coverage ranged from 98.1 to 99.2%.

Model comparison

Table 2 summarizes the model comparisons from LCA and MLCA for the first random split-half samples of male youth and female youth, respectively. Patterns of fit for both male and female youth were similar enough that their model selections are described together. In both samples, BIC favored a larger number of mutually exclusive classes. Among the LCA models, however, the increase in model fit was more drastic going from 1-class to 2-class, and from 2-class to 3-class. Further, profile plots of four or more classes demonstrated complex and small classes that were not conducive to interpretation or indicative of new themes; in 5, 6, and 7-classes, over 100 parameters were estimated at the expense of parsimony. A 3-class solution appeared to be a candidate model for both male and female youth. However, when MLCA models (i.e., youth as Level 1 and states as Level 2) were considered, it became clear that the MLCA model with 3 classes at Level 1 was the optimal model for both male and female youth because it had a better model fit than the 3-class LCA profile, while retaining the overall structure of the 3-class LCA profile.

Replication of optimal model

The MLCA model with 3 classes at Level 1 for both male and female youth was re-estimated using the second split-half sample for each gender group. As shown in Table 3, compared to their counterpart first split-half samples, the second split-half samples of male and female youth yielded similar profiles, with differences in profile prevalence ranging from 0.2 to 0.7% for male youth and 0.2–1.4% for female youth. Similarly, there were very little differences in the posterior probabilities for each of the 15 CFCIP service indicators between the first and second split-half samples. Among male youth, all differences in posterior probabilities ranged from 0.0 to 0.02; among female youth, differences in posterior probabilities ranged from 0.0 to 0.03. In conclusion, the small differences in profile prevalence and posterior probabilities between the random halves of the male and female sample indicated successful model replication.

Results

The MLCA model with 3 classes at Level 1 for male and female youth indicated that there were three distinct classes of male and female youth who received CFCIP services. These three distinct profiles were influenced by state-level (Level 2) characteristics such that youth could differ in their probability to belong to a certain latent class due to Level 2 differences, and further, state-level covariates were included in the multinomial logistic regression on the 3 classes to identify significant relationships between state-level characteristics and class membership. To give meanings to the MLCA model with 3 profiles at Level 1, Table 3 shows the estimated profile prevalence and posterior probabilities (i.e., probability of receipt of the 15 CFCIP service indicators) for the three distinct profiles of male and female youth, respectively, by split-half sample. While there is a general rule of thumb on qualitative interpretation of latent profiles based on items that epitomize each class (i.e., item probability > 0.7 is high; item probability < 0.3 is low) (Masyn 2013), the item probabilities of some profiles in this study did not reach the magnitude of these high or low item probability cut-offs. In these cases, items with the highest probabilities were used as primary descriptors of the profiles. In summary, both gender groups revealed differences in item probabilities across the three profiles that were indicative of a high-service receipt profile, a limited service receipt profile, and an independent living assessment and academic support receipt profile. Based on the first split-half samples of male (M) and female (F) youth:

High-Service Receipt Profile

This high-service receipt profile made up the smallest percentage of the samples (M: 23.4%; F: 22.7%). Youth in this profile were especially likely (probability ≥ 0.5) to receive these seven services together: independent living needs assessment (M: 0.57; F: 0.59), academic support (M: 0.71: F: 0.65), career preparation (M: 0.77; F: 0.75), budget and financial management (M: 0.81; F: 0.81), housing education and home management training (M: 0.77; F: 0.79), health education and risk prevention (M: 0.81; F:0.82), and family support and healthy marriage education (M: 0.63; F: 0.67).

Table 4 Relationship between latent CFCIP service profiles (reference: High Service Receipt Profile) and youth characteristics (level 1 covariates)[a]

	Male						Female					
	Independent living assessment and academic support receipt profile			Limited service receipt profile			Independent living assessment and academic support receipt profile			Limited service receipt profile		
	AOR	95% CI	*p*	AOR	95% CI	*p*	AOR	95% CI	*P*	AOR	95% CI	*p*
Age (ref: <18 years old)												
≥18 years old	0.3	0.2–0.4	***	2.8	1.5–5.1	**	0.3	0.2–0.5	***	2.7	0.9–7.8	n.s.
Ethnicity (ref: Caucasian)												
African American	1.0	0.8–1.3	n.s.	1.2	0.9–1.5	n.s.	1.0	0.8–1.3	n.s.	1.3	1.0–1.7	*
Hispanic	0.9	0.7–1.1	n.s.	0.9	0.8–1.1	n.s.	1.0	0.8–1.2	n.s.	1.0	0.8–1.2	n.s.
Other/missing	0.9	0.7–1.1	n.s.	0.8	0.5–1.1	n.s.	0.9	0.7–1.2	n.s.	0.9	0.7–1.3	n.s.
Education level (ref: ≤8th grade)												
9th–12th Grade	0.5	0.4–0.7	***	0.7	0.5–0.9	*	0.4	0.3–0.6	***	0.8	0.5–1.4	n.s.
Post-secondary/college	0.2	0.1–0.9	***	0.9	0.5–1.6	n.s.	0.1	0.0–0.3	***	1.6	0.8–3.4	n.s.
Missing	0.7	0.5–1.0	n.s.	0.9	0.4–1.6	n.s.	0.4	0.2–0.7	**	0.9	0.3–2.9	n.s.
Foster care in reporting period (ref: No)												
Yes (at some point)	0.8	0.6–1.1	n.s.	0.5	0.3–0.8	*	0.8	0.6–1.2	n.s.	0.4	0.2–0.7	**

*$p < .05$; **$p < .01$; $p < .001$

[a] AOR = Adjusted odds ratio; 95% CI = 95% confidence interval; ref = Reference group; n.s. = Not significant

Limited Service Receipt Profile

The limited service receipt profile consisted of the second majority of the samples (M: 27.6%; F: 29.8%). Although this profile was characterized by low probabilities to receive any type of service, it contained the highest probabilities of service receipt in educational financial assistance (M: 0.22; F: 0.30) and other financial assistance (M: 0.33; F: 0.33).

Independent Living Assessment and Academic Support Receipt Profile

The independent living assessment and academic support receipt profile made up the largest percentage of the samples (M: 49.0%; F: 47.6%) and was characterized by the highest probabilities of service receipt in independent living needs assessment (M: 0.48; F: 0.59) and academic support (M: 0.42; F: 0.37).

Youth Characteristics Associated with Service Receipt Profiles

Table 4 shows the adjusted odds ratios (AORs) associated with youth characteristics using the high-service receipt profile as the reference profile. Findings between male and female youth were comparable. Youth ages 18 or above were more than three times less likely of being in the independent living assessment and academic support receipt profile (M: AOR = 0.3, $p < .001$; F: AOR = 0.3, $p < .001$), compared to youth younger than 18 years old. Male youth and female youth with a 9th–12th grade education were two times less likely and more than two times less likely, respectively, to be in the independent living assessment and academic support receipt profile (M: AOR = 0.5, $p < .001$; F: AOR = 0.4, $p < .001$). Male youth and female youth with a post-secondary/college education were five times less likely and 10 times less likely, respectively, to be in the independent living assessment and academic support receipt profile (M: AOR = 0.2, $p < .001$; F: AOR = 0.1, $p < .001$), compared to those with an ≤8th grade education. Male youth and female youth who received foster care service or were in the foster care system at some point during the NYTD reporting period were more than one time less likely and more than two times less likely, respectively, of being in the limited service receipt profile (M: AOR = 0.8, $p < .05$; F: AOR = 0.4, $p < .05$).

There were gender-specific findings. Male youth ages 18 or above were more than two times more likely of being in the limited service receipt profile (AOR = 2.8, $p < .01$). Male youth with a 9th–12th grade education were more than two time less likely to be in the limited service receipt profile (AOR = 0.4, $p < .001$). African American female youth were more than one time more likely of being in the limited service receipt profile (AOR = 1.3, $p < .05$).

State characteristics associated with service receipt profiles

State-level influences were only found in the limited service receipt profile (Table 5). Male and female youth from states that serve foster care youth beyond age 18 versus those who did not had a 1.4 unit higher likelihood and a 1.2 unit higher

Table 5 Relationship between latent CFCIP service profiles (reference: High Service Receipt Profile) and state characteristics (level 2 covariates)[a]

	Male						Female					
	Independent living assessment and academic support receipt profile			Limited service receipt profile			Independent living assessment and academic support receipt profile			Limited service receipt profile		
	Beta	95% CI	*p*	Beta	95% CI	*p*	Beta	95% CI	*p*	Beta	95% CI	*p*
FY10 Foster care size (ref: 0–4999)												
5000–9999	−0.2	−1.2–0.8	n.s.	0.1	−1.2–1.5	n.s.	0.0	−1.0–1.0	n.s.	0.0	−1.0–1.1	n.s.
≥10,000	0.1	−1.4–1.5	n.s.	−0.6	−1.9–0.7	n.s.	0.2	−1.0–1.3	n.s.	−1.0	−2.2–0.4	n.s.
Serve youth age ≥ 18 (ref: No)												
Yes	−0.7	−1.7–0.4	n.s.	1.4	0.2–2.6	*	−0.7	−1.8–0.3	n.s.	1.2	0.2–2.3	*
Administration (ref: State-administered)												
County-administered	0.4	−0.8–1.6	n.s.	−1.0	−2.5–0.5	n.s.	0.0	−1.1–1.2	n.s.	−1.1	−2.6–7.6	n.s.
Hybrid	0.6	−0.7–1.9	n.s.	3.1	−0.9–7.1	n.s.	0.8	−0.6–2.3	n.s.	2.5	−2.6–7.6	n.s.
FY10 CFSR permanency composites[b] (ref: 0–1 Composite above standard)												
2–4 Composites above standard	0.4	−0.5–1.3	n.s.	−0.3	−1.4–0.9	n.s.	0.1	−0.8–1.1	n.s.	−0.1	−1.1–0.9	n.s.

*$p < .05$

[a] 95% CI = 95% confidence interval; ref = Reference group; n.s. = Not significant;

[b] CFSR = Child and Family Services Reviews

likelihood, respectively, of being in the limited service receipt profile, compared to the high service receipt profile (M: Beta = 1.4, $p < .05$; F: Beta = 1.2, $p < .05$).

Discussion

This study explored co-occurring patterns of independent living service receipt based on 3 years of NYTD service data to inform service provision to youth aging out of foster care. Focusing on youth in the service reporting periods in which they first received CFCIP services, this study identified an optimal MLCA model and replicated three distinct classes of youth characterized by high-service receipt, independent living assessment and academic support receipt, and limited service receipt that were evident among both male and female youth. The association between youth-level and state-level characteristics with these three latent classes was also examined.

Although characterized by high service utilization based on administrative records, the high-service receipt profile comprised the smallest proportion of youth in this study. This finding suggested that youth aging out of care who receive comprehensive, multiple independent living services are an exception rather than the norm, consistent with descriptive analyses of service receipt (Okpych 2015). A closer examination of service indicators with the highest probability of service receipt showed that these youth not only received assessments of their independent living needs, but they were also likely to receive academic support, career preparation, budget and financial management, housing education and risk prevention, health education and home management training, and family support and healthy marriage education. While the combination of different highly utilized services was promising, it was unclear whether more services are better since the NYTD does not measure the appropriateness of services to meet youth needs.

Nearly half of the male and female youth were in the independent living assessment and academic support receipt profile. This profile was characterized by high probabilities of receiving these two CFCIP services but low probabilities of receiving the remaining 13 CFCIP services. This class highlighted the finding in the CFCIP descriptive study by Okpych (2015) that academic support was the most prevalent CFCIP service, though the study did not examine independent living assessment. Youth ages 18 or above, or with a higher education level (9th grade or above) were less likely to be in this profile, which suggested that these very same youth who were more prepared academically and closer to the working age were more likely to be in the high-service receipt profile. These findings appeared to be developmentally appropriate: younger youth with a lower education level, regardless of gender and ethnicity, were more likely to receive a combination of independent living assessment and academic support only. The absence of significant state-level influences also indicated that membership in this profile was relatively homogenous across states.

The limited service receipt profile was the second largest class, comprising nearly 1/3 of the male and female youth. This profile was characterized by the highest probabilities of

receiving education financial assistance and other financial assistance and the lowest probabilities of receiving the remaining 13 CFCIP services, compared to the other two profiles. Youth ages 18 or above were more likely to be in this profile than in the high-service receipt profile. Simultaneously, youth from states that serve youth ages 18 or above were also more likely to be in the limited service receipt class. This combination of youth- and state-level findings indicates that older youth, in practice and by policy, though did not receive comprehensive services, at least received financial assistance during the additional window of foster care services as youth transition out of foster care. More nuanced differences emerged between male and female youth. African American female youth and female youth with a post-secondary/college education were also more likely to be in the limited service receipt profile, which partly illustrates service disproportionality among youth who exit the foster care system (Child Welfare Information Gateway 2011). At the same time, while youth who received foster care services at some point during the NYTD reporting period were less likely to be in the limited service receipt profile, this could simply mean that youth who were already in the system and received foster care services had the system's attention to receive comprehensives CFCIP services (i.e., high-service receipt profile), further demonstrating prior service receipt predicted future service receipt (Courtney et al. 2011).

While this current study contributes to the evidence base of independent living services, future research can build on this current study. The identification of three distinct service receipt profiles guides service and policy-driven hypotheses that can be tested in future studies. First, while states may be conducting routine independent living needs assessments and offering academic support to youth who are aging out of care, especially those who are younger, the sequencing of services may be important to examine to allow youth to receive non-financial assistance in tandem with financial assistance, which, according to this study, was mainly available to the limited service receipt class who were older. In practice, states' flexibility in defining eligibility for CFCIP services could potentially be guided by the three latent profiles that emerged from this study. Specifically, the developmental trajectory of CFCIP service offerings could benefit from further clarification. For example, should independent living needs assessment and academic support precede financial assistance related to higher education, housing, and other employment and socioemotional supports? This type of strategic decision-making of service provision is important to explore given limited state resources.

Second, this study illustrated certain services co-occurrences with higher probability than other services that may be important to consider in service implementation. Isolating the high-service receipt profile, youth had the highest probability of receiving career preparation, budget and financial management, and education supports in housing, home management, health education, and risk prevention. This constellation of services seems to be important baseline services for all youth at the developmental juncture of aging out of care, regardless of the youth's specific independent living needs. Identifying and examining the effect of core, baseline independent living services has the potential to unpack the critical components of the myriads of independent living service options states often struggle to discern.

Third, in contrast, services associated with the lowest probability of service receipt across classes include special education, post-secondary educational support, employment programs or vocational training program, mentoring, supervised independent living, and room and board financial assistance. Future studies may examine whether these services reflect fiscal constraints in state budgets rather than lower needs of the youth in these service area, or a service need (i.e., special education for youth with developmental disabilities) that may not apply to all eligible youth. This study's findings suggest that direct financial assistance for different facets of independent living may be harder to provide than other CFCIP services that are less costly. By the same token, it is an important research question whether states should allocate their limited funds on these services based on youth's independent living needs assessments. On the horizon of the proposed 2017 federal fiscal budget is a $4 million increase for CFCIP dedicated to evaluation research and development of innovative approaches to transitional services, as well as offering an option for states to extend the use of CFCIP funding for youth up to age 23 (U.S. Department of Health and Human Services 2016b). Finally, while few state-level characteristics yielded significant findings in latent profile membership, future policy research and policy analysis can identify business processes that outline how state-specific policy on the CFCIP is trickled down to individual youth who qualify for CFCIP services and how these processes could be modified to enhance efficiency and appropriateness of these services.

Future extension of the current study may focus on identifying theory-driven predictors of the three profiles that could facilitate states' proactive preparation of youth's transition out of care. For example, specific foster care experiences (e.g., placement type, placement stability) or systematic factors (e.g., spending patterns on CFCIP services) may predispose youth towards different levels of independent service receipt. The three profiles will have more substantive meanings if they are tied to youth outcomes such as housing stability, education achievement, healthy, psychosocial, and economic well-being. Using a representative sample to link CFCIP service receipt with

youth outcomes is a logical next step in future research. Collection of more nuanced service data—duration, dosage, and quality—may help identify any moderating influences on the service-outcome relationship.

Limitations

Although NYTD data collection broadly operationalizes the 15 CFCIP service indicators, states ultimately define what each service indicator entails. The loss of granular information includes duration, dosage, and quality of service that cannot be ascertained by the binary indicator of service receipt. For example, the NYTD does not distinguish a youth who received tutoring service (i.e., academic support) for a week from another youth who received tutoring services for 3 months. The precision of NYTD service data could therefore benefit from more standardized service definitions, technical assistance to states around data collection and submission, and partnerships among child welfare jurisdictions. Second, the complexity of independent living needs is not and should not necessarily be confined by these 15 domains. While the latent profiles are useful guideposts, local provision of CFCIP services may reveal service patterns not captured in the NYTD. Relatedly, using service receipt as a proxy for service need only holds true if services are offered to youth who need them, and conversely, if services are not offered when youth do not need them. Testing this assumption is beyond the scope of this study. Third, since youth in this study only appeared in one NYTD reporting period, it is unclear why these youth discontinued services. Discontinuation due to absence of service need, changes in eligibility status, or states' oversight in NYTD data submission have different implications and cannot be ascertained via secondary data analysis. Focusing on first-time service patterns, this study did not examine continuous service patterns in more than one reporting period or were in and out of service over time. Knowing the reasons for sustained services or service disruption can help states define or recommend parameters around the 15 CFCIP service types. Most importantly, since this study used NYTD service data and therefore did not and could not ascertain whether youth received the appropriate services to meet their particular needs, the three profiles identified in this study may not necessarily be needs-based. This limitation reaffirms the importance to link service profiles to youth outcome data to examine the appropriateness and effectiveness of the profiles.

The U.S. child welfare system may have traditionally focused more on the frontend or entry into the system, but ensuring youth leave the system well-equipped towards independent living is equally important. Much progress has been made since the establishment of the ILP in 1985 and the CFCIP in 1999. However, more can be done. No two youth are the same. Research, service, and policy need to apply the same rigor in protecting children from neglect and abuse in serving youth who are aging out of care. Examining services offered and received is the first step. Tailoring services to youth needs while demonstrating improved youth outcomes will be the ultimate goal.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval The authors received permission from the NDACAN to use the NYTD data. This study does not contain any studies with human participants performed by any of the authors.

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