

COMMUNITY CONTEXT AND IMPLEMENTATION OF SYSTEMS OF CARE

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TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
LIST OF TABLES	iv
Chapter	
I. Community Context and Implementation of Systems of Care.....	1
Introduction.....	1
Systems of care: Success at the individual level.....	2
Systems of care implementation	3
Access to care	4
Family choice and voice	7
Interagency and cross-sector collaboration.....	8
Method.....	9
Sample.....	10
Measures	10
Analyses.....	15
Results.....	15
Outreach and access to care	17
Family choice and voice	17
Interagency and cross-sector collaboration.....	18
Additional key results	19
Discussion	19
REFERENCES	24

LIST OF TABLES

Table	Page
1. System of Care Implementation Survey Factor Definitions and Components.....	12
2. Community-level Predictor Variables	14
3. Sample Characteristics.....	16
4. Multiple Regression Results	19

CHAPTER I

COMMUNITY CONTEXT AND IMPLEMENTATION OF SYSTEMS OF CARE

Introduction

Over the past few decades governmental agencies and a variety of organizations that address the needs of children with severe emotional disturbances have come to support the “system of care” (SOC) approach to mental health care (American Academy of Child and Adolescent Psychiatry, 2007, 2009; Substance Abuse and Mental Health Services Administration, n.d.). Stroul and Friedman (1986) describe the SOC approach as a “philosophy” about how to deliver services via a comprehensive, community-based, integrated system of service providers from multiple arenas. This study assesses SOC in a random sample of American counties - the level of analysis most relevant to such systems.

Several key events have contributed to what some term the system of care “movement” (Pires, 2002, p. 3). In the early 1980s, the National Institute of Mental Health began to fund states and localities through the Child and Adolescent Service System Program, focusing on developing relationships and cooperation between the various sectors with which children with serious emotional disturbances frequently deal. Shortly thereafter Congress passed legislation requiring states to cultivate community-based care for persons with serious mental illnesses (State Comprehensive Mental Health Services Plan Act). Congress followed with the Comprehensive Mental Health Services for Children and Their Families Program in 1992, granting substantial funds to states and

communities to implement systems development for children with serious mental problems and disabilities. As of October 2008 (beginning of the 2009 fiscal year), over 144 communities had been funded to build systems of care for children and their families (Walrath, et al., 2009), and four tenets characterized the efforts to reform child-serving systems: care should be driven by the needs of the family and child; services should be community-based and involve interagency collaboration; services should be designed with cultural context in mind; and families should be involved in decision-making and planning with regard to their child's care (SAMHSA, 2004).

Systems of Care: Success at the Individual Level

Empirical studies of SOC's have been mixed. Authors of a recent literature review (Cook & Kilmer, 2004) focus on the CMHS national evaluation of federally-funded SOC sites, and two large empirical studies. Results consistently showed that youth treated in SOC's received more mental health services than their counterparts in comparison sites; however outcomes for children were inconclusive. The large study comparing Fort Bragg with two other military base sites showed that child outcomes improved for those in the SOC site and the comparison sites alike. The other large study, in Stark County, Ohio, randomly assigned families to the SOC condition or treatment-as-usual, and found that all youth improved, but that those not enrolled in the SOC actually improved more than those in the SOC. Some studies published after this review, however, are more encouraging. For example, in central Indiana 354 families treated in an SOC site improved significantly over time. Although this study did not compare these children to others treated in a different type of system, it did show that clinical outcomes in these

settings improved for some children (Anderson, Wright, Kelley, & Kooreman, 2008). In another example (Foster, Stephens, Krivelyova, & Gamfi, 2007), propensity score analysis was used to study the effects of treatment in an SOC (n = 573 children). In two federally-funded SOCs and matched comparison sites, the SOCs generally were better at implementing SOC principles. The authors also found that the samples between paired sites were not well-matched, but that, when accounting for this discrepancy, children at one of the SOC sites improved significantly more over one year than those in its matched pair (the other matched pair showed no difference). Overall, studies of child outcomes in SOCs show mixed results, but the SOC philosophy continues to be supported by major funders and mental health-related institutions.

System of Care Implementation

Systems of care can be exceptionally difficult to implement. Even after several years of funding to implement core principles, none of the sites evaluated in a large 2001 study (Vinson, Brannan, Baughman, Wilce, & Gawron) were able to fully implement them all (here a set of 16 principles was generated by experts). Among the more difficult qualities to achieve were family involvement in system governance, pooling of funds between agencies, and establishment of cross-agency policies. Various authors have written guides and articles to assist in these difficult transitions (e.g., Hodges, Hernandez, & Nesman, 2003; Hoge & Howenstine, 1997; Pires, 2002). In this study, we investigated potential predictors of three key aspects of SOC implementation: *outreach and access to care, family participation, and interagency and cross-sector collaboration.*

Outreach and Access to Care

The ability of caregivers to access mental health care for children and the ability of providers to recommend appropriate services are critical to the success of the system. This study seeks knowledge about whether the context of the community in which a system of care operates has a relationship with the level of implementation of key factors, and what the nature of that relationship is. Several previous studies have linked community- or neighborhood-level variables to access to health care, but the predictor variables used by these studies have varied, as have definitions of “access.” Unless otherwise noted, all studies below controlled for relevant individual characteristics in analyses (age, gender, health status, education, etc.)

Rurality may influence health-related factors, though previous research has not been entirely consistent in clarifying its role. For example, rural health systems experience disadvantages such as physician shortages and higher rates of uninsured clients (Ricketts, 2000). Authors of a study utilizing a nationally representative sample of physicians and civilians concluded that individuals in rural communities may be more challenged when seeking mental health services and experience greater financial barriers to care than urban residents even though rural residents were not found to be at a disadvantage with respect to access to and quality of general medical care (Reschovsky & Staiti, 2005). However, Gresenz, Stockdale, and Wells (2000) found that population size was not a significant predictor of access to health care or behavioral health care in their large survey (n = 9,585).

Many studies have addressed the association of the *availability of health care* with access to care, though results are inconsistent. For example, a 2000 article reported

that the presence of an HMO was associated with higher general access to health care (Gresenz, et al.). Kirby and Kaneda (2005) included health care supply as a covariate in an analysis of the effects of neighborhood socioeconomic disadvantage on access to care; health care supply was not a significant predictor of unmet need or of getting recommended preventive screenings, but higher supply was significantly associated with having a usual source of care. Despite mixed results, there is a theoretical and potential empirical basis for considering indicators of health care supply in studies of access to care.

Racial composition, often measured as *minority prevalence*, of a community is related to residents' ability to obtain health care. In analyses of a 1996 nationally-representative sample of households (limited to white, black, and Latino individuals; n=14,740), researchers found that in counties with a high prevalence of blacks (v. low), blacks had lower rates of difficulty obtaining care and financial barriers to care; likewise in counties with higher prevalence of Latinos (v. low), Latinos had lower rates of difficulty obtaining care (Haas, et al., 2004). Another study found that at the county level, percent minority had a negative relationship with identification of adolescents needing treatment for substance abuse (Jones, Heflinger, & Saunders, 2007). *Immigration* may also influence the ability of a system of care to implement the key principles well, for the provision of appropriate care could be more challenging in areas with more diverse cultural issues surrounding mental health and stronger language barriers.

Economically disadvantaged communities may have poor access to health care. Gresenz, et.al, (2000) found that in low-income communities (compared to high income and medium income communities) those who received behavioral health care were less

likely to receive this care from specialty providers. Individuals living in disadvantaged neighborhoods (defined by resident poverty, unemployment, and education levels) have lower rates of a usual source of care, lower rates of meeting preventive care recommendations, and higher rates of unmet medical need (Kirby & Kaneda, 2005). Another study, which analyzed Medicare claims for substance abuse services in the state of Tennessee (nearly 190,000 claims nested in 95 counties), found that as county median income increased, the likelihood of adolescents engaging in treatment for their substance abuse disorders increased (Jones, et al., 2007). Finally, a 2005 study using a sample representative of the state of Ohio (n=16,261) found that county poverty (percent of residents with income under the federal poverty line) was negatively related to ability to identify a usual source of care (Litaker, et al.). A variety of indicators of disadvantage have been used, both as individual variables and as indices or factors. Alternatively, communities that are particularly *economically advantaged* may experience additional benefits related to system functioning. There is reason to think that advantage and disadvantage measure distinct concepts (i.e., that advantage represents more than a lack of disadvantage, and vice versa), though they likely be at least moderately correlated. Here, we will treat these two as separate constructs, including a measure of disadvantage as well as a measure of advantage in the model, as we expect that each will have a unique contribution to the reduction in variance.

Individual *residential instability* has been associated with various individual health outcomes, such as increased risk for development of depression in children (Gilman, Kawachi, Fitzmaurice, & Buka, 2003), while childhood residential stability has predicted more positive self-ratings of health at midlife (Bures, 2003). It is plausible that

community residential stability would have an affect on the access to care that individuals experience. Caregivers may be more aware of services or able to gain assistance from knowledgeable neighbors in areas with low rates of resident turnover.

Lastly, though not present in literature regarding neighborhood and community indicators, it is appropriate to control for the *prevalence of mental disability* in a community. Counties with higher prevalence of child mental disability may have systems that are better equipped to handle the mental health needs of their children.

Family Choice and Voice

Family choice about the services provided for children and family voice in planning and policymaking are two important aspects of the system of care philosophy. Generalized system of care documents and frameworks note the importance of these components, and offer examples of how to structure family involvement. One key source discusses specific strategies to include families at the policy, management, and services level; for example, families should compose at least 51% of the vote on governing bodies and serve as evaluators of system performance (Pires, 2002). Thus, many publications express ideals about the roles of families, yet none specifically address a relationship between contextual level characteristics (e.g., county economic advantage) and levels of family involvement or influence over a child's care. One could hypothesize, however, that certain area characteristics would influence this. In counties with much higher poverty rates or much lower educational attainment, system staff may be less open to family opinions, or less likely to take their concerns or recommendations seriously. In poorer counties or more rural counties, resources such as time and funding for agencies

may be more limited for families. Counties with high residential instability rates may have residents who find it difficult to become involved with an SOC for an extended period of time due to their own transience or due to service provider bias. There is a need for foundational research regarding community environments which inhibit or enhance participation of family decision-making within the systems that affect their children.

Interagency Collaboration

The very foundation of the system of care approach requires coordination and integration of various child-serving sectors. Some studies investigate collaboration and integration between diverse agencies such that these agencies work together in a coordinated way to provide comprehensive services for children with serious emotional disturbances. In a unique study that demonstrates the benefits of this SOC principle, researchers found that better coordination between child welfare agency workers and mental health agencies was associated with stronger relationships between children's needs and their actual service use (Hurlburt, et al., 2004). Another study used one system of care as an example to describe how to navigate the difficult tasks involved with coordination and collaboration between child-serving agencies (Anderson, McIntyre, Rotto, & Robertson, 2002). Though the authors discussed potential barriers, all were related to aspects of the agencies or members as opposed to characteristics of the community population or area. Despite a lack of research studies related to such community factors, one could generate hypotheses about their effects. Poorer counties may have fewer government funds or private resources to distribute to agencies, causing them to be less likely to partner with other sectors or fully integrate, wanting to protect

their budgets. More rural counties may have fewer agencies, fewer resources, and greater distances between agencies. It may be more difficult, therefore, to implement integration because of the inability to share space, inconvenience of meeting, and difficulties for families. Alternatively, rural areas could provide a more fertile context for integration, if it is that case that service provider employees are fewer and know each other better, or are more willing to collaborate because of these personal relationships.

This study will examine the relationships between community factors and elements of system of care implementation: *access to care*, *family involvement*, and *interagency collaboration*. The literature addressing access to care is the most developed with respect to this approach, but a contribution can be made to understanding each of the studied SOC elements, and perhaps, systems as wholes. I predict that *availability of low-cost health care*, *economic advantage*, *residential stability*, and *prevalence of child mental disorder* will be associated with higher implementation scores; while *rurality*, *minority prevalence*, *immigration*, and *economic disadvantage*, will be associated with lower implementation scores.

Method

This is a secondary analysis of a national survey to assess systems of care, the System of Care Implementation Survey (SOCIS), which asked key community informants about the implementation status of their local mental health care systems. The SOCIS was developed and data were collected by colleagues at the Florida Mental Health Institute, University of South Florida (see Kutash, Greenbaum, Wang, Boothroyd, & Friedman, 2008). Existing SOCIS data was combined with county-level data from

publicly available data sets. The Vanderbilt University Institutional Review Board reviewed the study and granted an exemption for secondary analysis of previously collected data.

Sample

The SOCIS stratified U.S. counties by poverty and population size. A total of 14 strata contained between 9 and 27 randomly sampled counties each. Field staff identified key informants with substantial knowledge of their communities' SOC from web searches and word-of-mouth, offering multiple ways to complete the survey (most respondents chose the web-based option). Respondents came from the following sectors: mental health, education, family member or advocate, and other child-serving sector (e.g. juvenile justice, child welfare). After deleting cases in which the respondent filled out demographic information only, but answered none of the substantive questions, 886 respondents remained, nested within 225 counties.

Measures

The dependent measures were generated from the SOCIS instrument, which is composed of 14 factors, each representing a distinct system of care principle. Each of the factors showed acceptable reliability; confirmatory factor analysis showed that the factors reflected the predictions of the original model (Kutash et al., 2008). Using multilevel modeling techniques, the SOCIS engineers identified seven of the 14 survey factors as having statistical validity in explaining the variation in mean response *between* counties (Greenbaum, Wang, Kutash, Boothroyd, & Friedman, 2008). Of these seven, I chose

three based on availability of data (some factors had substantial amounts of missing county data), and theoretical appropriateness. These factors, their component questions, and coefficient alphas are shown in Table 1.

Table 1
System of Care Implementation Survey Factor Definitions and Components

<p>OUTREACH AND ACCESS TO CARE</p> <p><i>“Outreach and service access are procedures (e.g., home visits, mental health workers in the schools) that facilitate obtaining care for all individuals in the identified population of concern.”</i></p>	<p><i>Component Questions</i> (alpha = .792)</p>
	<p>In your opinion, how easy or difficult is it for families to access mental health care in your community?</p>
	<p>Do you think parents in your community know how to obtain mental health care?</p>
	<p>Do you think child-serving professionals (e.g., teachers, pediatricians) in your community know how to refer families to obtain mental health care?</p>
<p>FAMILY CHOICE AND VOICE</p> <p><i>“Family and youth perspectives are actively sought and given high priority during all planning, implementation, and evaluation of the service system.”</i></p>	<p><i>Component Questions</i> (alpha = .828)</p>
	<p>Do families have a choice of which services will be provided to their child?</p>
	<p>Do families have a choice of who will be providing services to their child?</p>
	<p>How often have you seen families serving as members of planning or coordinating groups for the service system (e.g., members of interagency councils, advisory boards)?</p>
	<p>How often have you seen families or a family organization express independent views or recommendations about the service system?</p>
	<p>How often is family voice incorporated throughout the planning and policy making process?</p>
<p>INTERAGENCY AND CROSS-SECTOR COLLABORATION</p> <p><i>“A formal process with facilitating collaboration among the various child-serving sectors (e.g., mental health, education, child welfare, juvenile justice). This process usually includes an Interagency Committee, which has designated participants who represent the various agencies and have regularly scheduled meetings.”</i></p>	<p><i>Component Questions</i> (alpha = .822)</p>
	<p>Approximately how often does an interagency committee or group meet to focus on service system planning for children and their families? *1-7 options</p>
	<p>How often do decision makers from the educational system actively participate in this council or group? *1-7 options</p>
	<p>To what extent does your organization share resources (e.g., funding, personnel, data, facilities) with other child-serving organizations in the following activities:</p>
	<p>Creating formal agreements</p>
	<p>Staff training</p>
	<p>Purchasing of services</p>
	<p>Service plan development</p>
	<p>Program evaluation</p>
	<p>Are there written agreements between the Department of Education and Mental Health to have mental health agencies provide services in schools?</p>

Note. (adapted from Kutash, et al., 2008). Unless otherwise noted, responses are given on a 1-5 Likert scale with 5 being the highest.

Most of the SOCIS questions sought responses on a Likert scale of one to five, with five being the highest. Two exceptions, scaled one to seven, were rescaled to match the others. A mean factor score was calculated for each respondent. If the respondent answered fewer than 75% of the questions within a factor, then his or her responses were not included in the analysis for that factor. A mean county-level factor score was created by averaging the all respondent scores within each county. Probability weights provided by SOCIS authors were adapted and applied to all counties within each stratum to account for the complex sampling design, thus making the data nationally representative at the county level. For *outreach and access to care*, and for *interagency and cross-sector collaboration*, one and five counties, respectively, had missing data; these cases were dropped in analyses for these dependent variables, and probability weights were adjusted to account for their absence.

There are a number of community-level predictor measures. Many of these measures are highly correlated (e.g., income levels and education levels), and have been combined in different ways in different studies. This study uses indices of relevant predictors when appropriate, loosely following a typology generated in a recent article investigating community effects at the census tract level (Freedman, Grafove, Schoeni, & Rogowski, 2008). Adjustments were made to account for this study's target population (children as opposed to retired adults) and to separate county racial composition variables from other constructs. This study primarily utilizes U.S. Decennial Census data (U.S. Census Bureau, 2002), but one predictor is drawn from the Community Health Status Indicators dataset (Community Health Status Indicators Project Working Group, 2008). Variables were downloaded in raw form (mostly counts), which were subsequently

divided by the relevant population counts to generate percentages. In creating each index, if all component variables were in percent form, then the components were averaged; if variables were on different scales, then they were first standardized (z-score), then averaged.

Table 2
Community-level Predictor Variables

Predictor	Alpha or Correlation	Component Variables	Source
Rurality	--	Pct rural	2000 Census
Low-cost care availability	--	Presence of an HRSA-funded community health center	2007 CHSI
Minority prevalence	--	Pct population non-white, non-Hispanic	2000 Census
Immigration	.92	Pct population foreign-born	2000 Census
		Pct population over 5 with limited English	2000 Census
Economic disadvantage	.86	Pct housing units without a vehicle	2000 Census
		Pct population in poverty, all ages	2000 Census
		Pct children in poverty	2000 Census
		Pct households with public assistance income	2000 Census
		Pct civilian population 16 and over who are unemployed	2000 Census
Economic advantage	.86	Upper quartile value of owner-occupied housing units	2000 Census
		Pct population 25 and over with BA or advanced degree	2000 Census
		Pct households with income \$75,000+/yr	2000 Census
Residential stability	.91	Pct population over 5 in same house since 1995	2000 Census
		Median time in unit	2000 Census
Prevalence of child mental disability	--	Pct 5-15 yr population with a mental disability	2000 Census

Note. The source year indicates the year in which the data was collected, or up to which the data is current, not the year in which it was released.

Percent rural is the percent of the population of a county designated as “rural” or not part of an “urban area” or “urban cluster,” based on population density at the block or block group level. *Low-cost care availability* is measured by the presence of a community health center providing care for low-income and uninsured individuals and families, and at least partially funded by grants from the Health Resources and Services

Administration. *Minority prevalence* was generated by calculating the percentage of county residents not designated as “white race alone.” *Immigration, economic disadvantage, economic advantage, and residential stability* are indices of the variables indicated in Table 2. *Mental disability* was defined as a condition making it difficult to learn, remember, or concentrate, that has lasted for 6 or more months (for an individual five years or older).

Analyses

A multiple regression model examined the associations of the predictor variables with SOC implementation factors. Each factor score is a continuous variable ranging from 1 to 5. The analyses employed Stata 10.1 (StataCorp, 2007) statistical software, which includes a feature to account for complex sampling designs, and yields robust standard errors (StataCorp, 2005).

Results

Descriptive data on the sample of individual respondents and counties are shown in Table 3.

Table 3
Respondent and County Characteristics

Respondent Characteristics (N = 886)		County Characteristics (N = 225)	
Female: Pct	71.4	Number of Respondents: Median	3
Age: Mean in Years (S.D.)	48.8 (9.67)	Extent to which system is a SOC: Mean (1-5) (S.D.)	3.2 (0.72)
Knowledge Level: Mean (1-5) (S.D.)	4.4 (0.82)	SOC grantee site: Pct of all counties	23.6
Years Involvement: Mean (S.D.)	17.8 (9.70)	Rural: Mean Pct (S.D.)	31.7 (0.30)
Ethnicity: Pct		Low-cost Health Care Availability: Pct of all counties	30.2
European/White	84.8	Minority: Mean Pct (S.D.)	21.7 (16.8)
African American	7.7	Child Mental Disability: Mean Pct (S.D.)	4.8 (1.23)
Hispanic/Latino	3.9	SOCIS Factor Score: Mean (S.D.)	
Mixed	2.2	Family Choice & Voice	3.4 (0.62)
Other	<1.5	Outreach & Access to Care	3.0 (0.66)
Type of Involvement: Pct		Interagency & Cross-sector Collaboration	3.0 (0.58)
Mental Health	34.4		
Education	26.1		
Family	7.8		
Other	31.7		

Note. Standard deviation appears in parentheses next to means.

The largest group of individual respondents came from the mental health sector, whereas a relatively small proportion of family members and advocates responded to the survey. The majority of respondents were white, primarily female, and middle-aged. A preliminary survey question asked respondents to rate how knowledgeable they were about their local children’s mental health services systems on a scale of one to five, with five being the best. Because nearly 15% of the respondents left this question blank, an average value is likely skewed toward a higher knowledge rating; however, the average for those who did respond was an encouraging 4.35. The number of years of active involvement in children’s mental health services ranged from 0.5 to 55, with a mean of 17.8. The counties sampled had an average of almost 32% rural population. Nearly 24% of counties were official recipients of a grant to promote systems of care. Most counties had between one and three respondents, with a median of three, though the maximum

number reached 27 in one county. The sample mean ratings on the outcome scales were 3.4 out of 5 for *family choice and voice*; 3.0 for *outreach and access to care*; and 3.0 for *interagency and cross-sector collaboration*.

Outreach and Access to Care

For this outcome, only *residential stability* was a significant predictor. Since this predictor is a standardized index, an increase in a county's residential stability value of one standard deviation predicts an increase of 0.178 points on the *outreach and access to care* factor score. The model is significant ($p < .0001$), but the r-squared value is only 0.129. Surprisingly, no other variable examined made an independent contribution. Unstandardized Beta coefficients and standard errors for the model are shown in Table 4.

Family Choice and Voice

A model composed of community contextual predictors explained 21% of the variance in *family choice and voice*. *Rurality*, *economic disadvantage*, and *residential stability* were significant predictors. *Rurality* had a negative association with *family choice and voice*, such that the difference between a primarily urban county (one with, say, 20% rurality) and a primarily rural county (one with 80% rurality) would be expected to correspond to the *family choice and voice* factor score such that the more rural county would score 0.540 points fewer on this factor. This value is substantial given that the scale on which the factor is measured only ranges from one to five. *Residential stability* and *economic advantage* had positive associations with the outcome. Holding all other predictors constant, for a one standard deviation increase in *residential stability*, we

expect an increase of over one-third of a point (0.367) in *family choice and voice*; and for a one standard deviation increase in *economic advantage*, we expect an increase of almost a quarter of one point (0.244) in the county factor score.

Interagency and Cross-Sector Collaboration

Rurality, child mental disability prevalence, and economic disadvantage were significant predictors of *interagency and cross-sector collaboration*. Again, *rurality* had a negative association with this SOC principle (in this case, a 60% increase in county rurality – the difference between a low rurality county of 20% and a high rurality county of 80% - corresponds to a predicted decrease in the county's *interagency and cross-sector collaboration* factor score of 0.240 points). *Child mental disability prevalence*, as expected, has a positive association with this implementation factor score; an increase of one percent child mental disability in a county is associated with a predicted increase of 0.103 in the county factor score. Surprisingly, *economic disadvantage* has a significant and positive association with the *interagency and cross-sector collaboration* mean score at the county level, such that a 10% increase in the average disadvantage score predicts a 0.44 increase in the overall county factor score. In fact, despite being a non-significant predictor for the other two dependent variables, *economic disadvantage* had a positive association with all implementation factors.

Table 4
Multiple Regression Results

	Outreach & Access to Care		Family Choice & Voice		Interagency & Cross-sector Collaboration	
	R ² = 0.129**		R ² = 0.210**		R ² = 0.176**	
	B	SE	B	SE	B	SE
Rurality	-.007	.005	-.009*	.004	-.004*	.002
Low-cost Health Care Availability	.244	.174	.264	.204	.071	.120
Minority Prevalence	.000	.008	-.003	.006	-.003	.005
Economic Disadvantage	.007	.034	.023	.025	.044*	.022
Economic Advantage	.183	.122	.244*	.122	.141	.094
Immigration	-.025	.016	-.017	.017	-.020	.010
Residential Stability	.178**	.068	.367**	.089	.050	.039
Prevalence of Child Mental Disability	.086	.063	.081	.056	.103**	.028

* $p \leq .05$; ** $p \leq .01$

Additional Key Results

Unfortunately, multicollinearity among the independent variables is considerable in this data set. None of the pairwise correlations exceeded .60 though *rurality* was correlated at absolute values greater than .4 with five of the other independent variables in the model. The mean variance inflation factor is an unalarming 1.93; however, individual VIFs for *economic disadvantage*, *economic advantage*, *rurality*, and percent *minority* all exceed 2.0, which indicates a potential problem. This issue almost certainly has plagued the results of these analyses by confounding relationships among independent variables.

Discussion

This study finds that community contextual variables can account for some amounts of variation in SOCIS factors: *family choice and voice*, *outreach and access to care*, and *interagency and cross-sector collaboration*. *Rurality* was negatively related to

each of the factors, though only statistically significant for *family involvement* and *interagency collaboration*. *Residential stability* was positively related to each factor, but was statistically significant only for *family involvement* and *access to care*. The model explained little of the variation in the factor measuring access - *outreach and access to care* – despite the fact that the model’s components were principally based on literature which showed relationships between these variables.

The finding that *family choice and voice* scores are negatively related to *rurality* is consistent with the study’s hypotheses. In more rural counties, one might expect parents to have to travel further to be involved in service planning and delivery; combined with increased rates of disadvantage and decreased access to care, rural parents may have increased barriers to involvement. In addition, rural service systems themselves may have less funding, be more spread out, and be less well-equipped to coordinate with families and involve them in system-level processes. Mental health professionals may feel less inclined to listen to and respond to parent involvement for other reasons, perhaps assuming lower education status or ability to contribute to the process. A positive association between *family choice and voice* and *economic advantage* is also not surprising. In counties with greater affluence, parents may have more power and more education, and mental health system decision-makers may be more inclined to accommodate them. Finally, *residential stability* had the predicted positive relations to *family choice and voice*. In areas with little residential turnover, it may be easier for service systems to build relationships with residents, share knowledge, and incorporate their opinions and wishes into care plans for their children.

What is most surprising about these results is that the majority of the theoretical and empirical basis for the model was derived from studies examining access to care, yet this dependent variable was explained least by the model. Other factors which have been associated with access, like *availability of care* and *economic disadvantage*, were not statistically significant. It is unlikely that out of these, *residential stability* alone is a predictor; it is more likely that complex relationships among the independent variables are confounding potential relevant relationships with the dependent variable. Interaction effects between variables were explored, but there was little basis for using one interaction effect over another; theoretically, a number of potential interactions could be taking place. Unfortunately, because of the relatively small sample size, it is difficult to disentangle the independent variables from one another.

There are some limitations to this study. A number of factors which could explain how and why various agencies collaborate could operate at other levels of analysis and could include far more subjective things, like types of leadership and management styles, as well as complex mechanisms, like funding streams dictated by state or county-level governments, but were not available to explain the variation in these SOCIS factor scores. In addition, a relationship existed between the type of respondent and the mean factor score for each of the three dependent variable factors. Tabulations indicated that mental health professionals rate implementation scores highest, while educational professionals and advocates/family members gave the lowest ratings for all three factors. The county-level analysis did not account for the types of respondents whose scores were averaged to create the county-level data set, which could affect model results. Because of this and additional factors, agreement between raters within counties was not optimal.

In addition, several of the predictor variables may not be valid measures of their underlying concepts. For example, the binary indicator of presence of a community health center may not account for availability of mental health care or for other community providers. The census variable for *rurality* does not distinguish between potentially important concepts, like suburban attributes or adjacency to an urban county, which could provide residents with additional resources. Parent or proxy report of *child mental disability* using the U.S. Census questionnaire can be biased. Alternative versions of several predictors were tested, but did not improve the analyses.

A sample size of 225 counties easily exceeds the minimum for a power analysis, but is somewhat small for use with robust estimation techniques like those used in Stata's probability weighting function. Additionally, despite the great utility of this novel data set, some weaknesses exist. In the majority of sampled counties, three or fewer key informants provided survey data, and in 34 counties, only one respondent completed a survey.

A final issue in these analyses is the difficulty of specifying an appropriate model. There is little theoretical or empirical work regarding community contextual affects on family participation and interagency collaboration, so these models simply followed that specified for *access to care*. In addition, multicollinearity between some of the predictors, as mentioned above, could have affected model results.

Despite limitations to this study, there are community contextual factors which can help to predict system of care implementation status. This study is one of the first analyses of SOCIS data, which is the first nationally-representative set available at the county level to assess SOC implementation status. Because this is one of the first studies

of this type and there has been little work on which to base hypotheses and model specifications, findings should be viewed as exploratory in nature, and form the basis for further research.

Future research would benefit from exploring different model specifications and including, if possible, more subjective indicators of county context. In-depth analysis of the top- and bottom- performing counties in each factor may shed light on the characteristics that enhance or inhibit system functioning. Because mental health policy and funding is affected by state-level administration and policy, one potentially useful study could utilize the SOCIS instrument to collect comprehensive data within one state, taking care to recruit multiple respondents from each county, and either to recruit all respondents from one type, or to ensure a that every county's data includes similar proportions of respondents of all types so that this does not unduly influence results. Though interpretation of the present findings is difficult, we can conclude that systems of care are affected by the communities in which they are embedded. These relationships need to be clarified so that assistance efforts can be tailored to the needs of each system.

REFERENCES

- American Academy of Child and Adolescent Psychiatry (2007). Practice parameter on child and adolescent mental health care in community systems of care. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46(2), 284-299.
- American Academy of Child and Adolescent Psychiatry (2009). Systems of care information and resources Retrieved February 9, 2009, from http://www.aacap.org/cs/root/member_information/practice_information/systems_of_care_information_and_resources
- Anderson, J. A., McIntyre, J. S., Rotto, K. I., & Robertson, D. C. (2002). Developing and maintaining collaboration in systems of care for children and youths with emotional and behavioral disabilities and their families. *American Journal of Orthopsychiatry*, 72(4), 514.
- Anderson, J. A., Wright, E. R., Kelley, K., & Kooreman, H. (2008). Patterns of clinical functioning over time for young people served in a system of care. *Journal of Emotional and Behavioral Disorders*, 16(2), 90-104.
- Bures, R. M. (2003). Childhood residential stability and health at midlife. *American Journal of Public Health*, 93(7), 1144-1148.
- Community Health Status Indicators Project Working Group (2008). Data Sources, Definitions, and Notes for CHSI2008., from Department of Health and Human Services: <http://communityhealth.hhs.gov>
- Cook, J. R., & Kilmer, R. P. (2004). Evaluating systems of care: Missing links in children's mental health research *Journal of Community Psychology*, 32(6), 655.
- Foster, E.M., Stephens, R., Krivelyova, A., & Gamfi, P. (2007). Can system integration improve mental health outcomes for children and youth? *Children and Youth Services Review*, 29(10), 1301-1319.
- Freedman, V. A., Grafove, I. B., Schoeni, R. F., & Rogowski, J. (2008). Neighborhoods and disability later in life. *Social Science & Medicine*, 66, 2253-2267.
- Gilman, S. E., Kawachi, I., Fitzmaurice, G. M., & Buka, S. L. (2003). Socio-economic status, family disruption and residential stability in childhood: Relation to onset, recurrence and remission of major depression. *Psychological Medicine*, 33, 1341-1355.
- Greenbaum, P. E., Wang, W., Kutash, K., Boothroyd, R., & Friedman, R. (2008). *Multilevel confirmatory factor analysis of the SOCIS*. Paper presented at the the

22nd annual meeting of A System of Care for Children's Mental Health:
Expanding the Research Base.

- Gresenz, C. R., Stockdale, S. E., & Wells, K. B. (2000). Community effects on access to behavioral health care. *Health Services Research, 35*(1), 293.
- Haas, J. S., Phillips, K. A., Sonneborn, D., McCulloch, C. E., Baker, L. C., Kaplan, C. P., et al. (2004). Variation in access to health care for different racial/ethnic groups by the racial/ethnic composition of an individual's county of residence. *Medical Care, 42*(7), 707.
- Hodges, S., Hernandez, M., & Nesman, T. (2003). A developmental framework for collaboration in child-serving agencies. *Journal of Child and Family Studies, 12*(3), 291-305.
- Hoge, M. A., & Howenstine, R. A. (1997). Organizational development strategies for integrating mental health services. *Community Mental Health Journal, 33*(3), 175.
- Hurlburt, M. S., Leslie, L. K., Landsverk, J., Barth, R. P., Burns, B. J., Gibbons, R. D., et al. (2004). Contextual predictors of mental health service use among children open to child welfare. *Archives of General Psychiatry, 61*(12), 1217.
- Jones, D. L., Heflinger, C. A., & Saunders, R. C. (2007). The ecology of adolescent substance abuse service utilization. *American Journal of Community Psychology, 40*(4), 345-358.
- Kirby, J. B., & Kaneda, T. (2005). Neighborhood socioeconomic disadvantage and access to health care. *Journal of Health and Social Behavior, 46*(1), 15-31.
- Kutash, K., Greenbaum, P. E., Wang, W., Boothroyd, R., & Friedman, R. (2008). *Overview of the System of Care Implementation Survey (SOCIS): Instrument and Descriptive Results from 225 Counties*. Paper presented at the the 22nd annual meeting of A System of Care for Children's Mental Health: Expanding the Research Base.
- Litaker, D., Koroukian, S. M., & Love, T. E. (2005). Context and healthcare access: Looking beyond the individual. *Medical Care, 43*(6), 531.
- Pires, S. (2002). *Building systems of care: A primer*. Washington, D.C.: National Technical Assistance Center for Children's Mental Health, Georgetown University Child Development Center.
- Reschovsky, J. D., & Staiti, A. B. (2005). Access and quality: Does rural American lag behind? *Health Affairs, 24*(4), 1128-1139.

- Ricketts, T. C. (2000). The changing nature of rural health care. *Annual Review of Public Health, 21*, 639-657.
- StataCorp (2005). *Stata Survey Data: Reference Manual Release 9*. College Station, TX: StataCorp LP.
- StataCorp (2007). *Stata Statistical Software: Release 10*. College Station, TX: StataCorp LP.
- Stroul, B. A., & Friedman, R. (1986). *A system of care for children and youth with severe emotional disturbances* (Rev. ed.). Washington, DC: Georgetown University Child Development Center, CASSP Technical Assistance Center.
- Substance Abuse and Mental Health Services Administration (2004). Comprehensive Community Mental Health Services Program for Children and Their Families. Retrieved March 9, 2009, from <http://mentalhealth.samhsa.gov/publications/allpubs/Ca-0013/default.asp>
- Substance Abuse and Mental Health Services Administration (n.d.). Systems of care Retrieved February 9, 2009, from <http://systemsofcare.samhsa.gov/>
- U.S. Census Bureau (2002). *Census 2000 summary file 3* [data file]. Retrieved from http://factfinder.census.gov/servlet/DCSubjectShowTablesServlet?_ts=252808130191
- Vinson, N. B., Brannan, A. M., Baughman, L. N., Wilce, M., & Gawron, T. (2001). The system-of-care model: Implementation in twenty-seven communities. *Journal of Emotional and Behavioral Disorders, 9*(1), 30-42.
- Walrath, C., Garraza, L.G., Stephens, R., Azur, M., Miech, R., & Leaf, P. (2009). Trends in characteristics of children served by the Children's Mental Health Initiative: 1994-2007. *Administration and Policy in Mental Health and Mental Health Services Research, 36*(6), 361-373.