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Social Cohesion and the Smoking Behaviors of Adults Living with Children

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Abstract

Introduction—The smoking behavior of adults can negatively impact children through exposure to environmental tobacco smoke and by modeling this unhealthy behavior. Little research has examined the role of the social environment in smoking behaviors of adults living with children. The present study specifically analyzed the relationship between social cohesion and smoking behaviors of adults living with children.

Methods—Data from the 2009 California Health Interview Survey, a random-digit dial cross-sectional survey of California Adults, were used. Adults living with children reported their levels of social cohesion and smoking behaviors (N=13,978). Logistic regression models were used to predict odds of being a current smoker or living in a household in which smoking was allowed, from social cohesion.

Results—Overall, 13% of the sample was current smokers and 3.74% lived in households in which smoking was allowed. Logistic regression models showed that each one-unit increase in social cohesion is associated with reduced odds of being a current smoker (AOR= 0.92; 95% CI= 0.85–0.99) and reduced odds of living in a household in which smoking is allowed (AOR= 0.84; 95% CI= 0.75–0.93), after controlling for sociodemographic characteristics.

Conclusions—Among adults living with children, higher social cohesion is associated with a lower likelihood of both being a smoker and living in a home where smoking is allowed. Thus, future research is needed to better understand mechanisms that explain the relationship between social cohesion and smoking-related behavior in order to prevent smoking-related health consequences and smoking initiation among children and adults.

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Contributions

Alcalá, conceived of the study, analyzed data and contributed to all manuscript drafts. Sharif and Albert helped in writing all drafts and provided feedback to the analyses and discussion. All authors contributed to and have approved the final manuscript

Conflicts of Interest

Authors have no conflicts of interest to disclose.

1. Introduction

Each year, 480,000 Americans die from the effects of smoking, and 10% of these deaths are from the effects of secondhand smoke (U.S. Department of Health and Human Services, 2014). Despite a decline in smoking rates in the last decade (Syamlal, Mazurek, Hendricks, & Jamal, 2014), rates are still high considering that 18.1% of adults currently smoke cigarettes (Blackwell, Lucas, & Clarke, 2014). There is a need for more research to better understand the factors shaping smoking behavior to help reduce smoking-related adverse health consequences and premature mortality.

There is a dearth of literature on smoking behavior among adults living with children. This is a particular subgroup that merits attention given that their behavior can not only negatively impact their own health and health behaviors but of the children with whom they reside as well. Moreover, children are particularly vulnerable to the effects of smoking via two mechanisms: 1) increased risk of asthma and other respiratory illnesses, (Cook & Strachan, 1999; Ehrlich et al., 1996) ear infections and sudden infant death syndrome (Cook & Strachan, 1999) due to exposure to secondhand smoke and 2) the strong role (caregiver) modeling plays in establishing behaviors such as smoking initiation. Social Cognitive Theory (Bandura, 1986; Bandura & McClelland, 1977), describes how behaviors are developed as a result of reciprocal interactions between the individual, interpersonal relationships and environmental characteristics including observing parents' behaviors and attitudes (Schuck, Otten, Engels, & Kleinjan, 2012). This can help explain why children are at a higher risk of becoming smokers if they are exposed to family members that smoke (Bricker, Peterson, Andersen, et al., 2006; Bricker, Peterson, Leroux, et al., 2006; Melchior, Chastang, Mackinnon, Galéra, & Fombonne, 2010; Peterson et al., 2006), have friends that smoke (Bricker, Peterson, Andersen, et al., 2006) or are exposed to media depicting smoking (Dalton et al., 2003). Furthermore, children of smokers are more likely to hold positive attitudes towards smoking than their peers with non-smoking parents and children's exposure to smoking in one's environment is associated with more perceived benefits and less perceived risks of smoking compared to children who are not exposed to environmental smoking (Schuck et al., 2012). Given these reasons, it is important to assess the smoking-related behaviors of adults living with children.

Considering the strong role the social environment plays on smoking behavior, emerging research is assessing how smoking can be shaped by neighborhood factors including deprivation (Cubbin et al., 2006), the availability of retail outlets that advertise and sell cigarettes (Henriksen, Schleicher, Feighery, & Fortmann, 2010) and banning smoking in homes (Pizacani, Maher, Rohde, Drach, & Stark, 2012). An additional factor of the social environment that can impact health is social cohesion, which refers to both the absence of latent conflict and the presence of strong social bonds at the community level (Kawachi & Berkman, 2000) and distinct from family cohesion, which refers to emotional bonding and closeness among family members (Johnson, Lavoie, & Mahoney, 2001). When social cohesion in a community is high, individuals cooperate with each other for the collective good of all (Stanley, 2003). Social cohesion has been shown to alter parenting behavior (Roche, Ensminger, & Cherlin, 2007) in such a way that high cohesion leads to diminished parental involvement, potentially because these parents can rely on others, such as

neighbors, to be involved. In terms of health, higher levels of social cohesion have been linked to better mental health (Echeverria, Diez-Roux, Shea, Borrell, & Jackson, 2008; Johns et al., 2012), decreased mortality (Inoue, Yorifuji, Takao, Doi, & Kawachi, 2013), higher levels of physical activity and lower levels of smoking (Echeverria et al., 2008; Patterson, Eberly, Ding, & Hargreaves, 2004). Yet, to date, smoking research has largely ignored the effect of social cohesion among adults living with children.

Social cohesion can impact health behaviors, like smoking, through three mechanisms. First, high levels of social cohesion in a neighborhood can promote increased social support which refers to perceived or realized emotional or functional assistance from friends, loved ones or others (Thoits, 2010). This is important because social support has been associated with greater success with smoking cessation and smoking abstinence (Murray, Johnston, Dolce, Lee, & O'Hara, 1995). Moreover, social support has been associated with positive changes at the cognitive level, including greater self-efficacy (Samuel, Commodore-Mensah, & Dennison Himmelfarb, 2013), which can facilitate behaviors including smoking cessation or reluctance to initiate smoking behavior. Second, high levels of social cohesion can promote socialization to neighborhood norms (Samuel et al., 2013), which may condemn or condone smoking. Lastly, social cohesion can help buffer against stress, which is a risk factor for smoking (Kandula, Wen, Jacobs, & Lauderdale, 2009).

In the U.S. increased social cohesion has been negatively associated with smoking among Brazilian immigrants (Holmes & Marcelli, 2014), some Latino subgroups (Alcantara, Molina, & Kawachi, 2014; Li, Horner, & Delva, 2012), African-American women living in subsidized housing (Andrews et al., 2014) and Asian-American men (Kandula et al., 2009; Li & Delva, 2012). However, associations are not observed in all studies (Li & Delva, 2011; Reitzel et al., 2013; Samuel et al., 2013). These inconsistent findings may be attributable to differing definitions of social cohesion, different study methodologies or may reflect a real differential impact of social cohesion between groups. One subgroup, in particular, that has yet to be studied is adults who reside with children. This is an important oversight because these individuals may have more than just a personal stake in the social connectedness of their neighborhoods, because they live with children who may be dependent on them and are more vulnerable. Consequently, these individuals may be more sensitive to the effects of social cohesion. Given the potential importance of social cohesion for this subgroup, the goal of the present study is to study smoking behavior among adults living with children using a large, multi-ethnic sample.

2. Materials and Methods

2.1 Data Source

Data come from the 2009 Adult California Health Interview Survey (CHIS). This cross-sectional telephone survey of California adults, age 18 and over, was conducted between September 2009 and April 2010. The CHIS was administered in English, Spanish, Mandarin, Cantonese, Vietnamese and Korean and was designed to be representative of California adults living in households (California Health Interview Survey, 2011). The CHIS includes replicate weights and adjustments to account for differential selection probabilities,

non-response bias and stratification (California Health Interview Survey, 2011). Data was publically available and did not require IRB approval.

Overall, 47,614 adults completed the survey, and missing data were imputed using hot deck imputation by the CHIS (California Health Interview Survey, 2011). Missing values were imputed using donor values from individuals with similar characteristics on gender, age, race/ethnicity, poverty level, educational attainment and geographic region (California Health Interview Survey, 2011). Once a particular donor value was used, it was removed from the pool of potential donors (California Health Interview Survey, 2011). Overall, most CHIS variables had missing values for less than 2% of the sample, with some cases, like household income, having over 20% missing (California Health Interview Survey, 2011).

The social cohesion module was only administered to respondents who reported living with children under 18 years of age (N=14,261). Social cohesion questions were not ascertained or imputed for respondents who had a proxy responding on their behalf, yielding 283 missing cases and a final sample of 13,978.

2.2 Variables

The independent variable of interest was social cohesion. Social cohesion was assessed using a four-item scale, similar to previously used scales (Sampson, Raudenbush, & Earls, 1997). Questions measured the degree to which respondents agreed or disagreed with the following items: 1) People in this neighborhood can be trusted, 2) People in my neighborhood are willing to help each other, 3) People in this neighborhood generally do not get along with each other, and 4) You can count on adults in this neighborhood to watch out that children are safe and don't get in trouble. Items were measured on a four-point Likert scale (strongly agree to strongly disagree). Three items were reverse coded so that higher scores would indicate stronger social cohesion. Respondents indicating that item number four was not applicable were recoded to missing (N=172). All items were then averaged using Stata's rowmean function, which calculates the mean even if cases have missing values. This scale was then multiplied by four and minimum value set to zero, to emulate a sum of the original items (range: 0–15; Cronbach's $\alpha = 0.78$).

There were two smoking related dependent variables of interest. The first measured whether or not a respondent was a current smoker (i.e. smoke every day or some days). In order to be considered a current smoker, respondents needed to respond "yes" to the question, "Altogether, have you smoked at least 100 or more cigarettes in your entire lifetime?" and indicate "everyday" or "some days" to the question "Do you now smoke cigarettes every day, some days, or not at all?" Non-current smokers served as the reference group. Respondents were asked, "Is smoking ever allowed inside your home?" to measure if smoking was allowed in the household, with "No" serving as the reference group.

Gender, age, income, years of education, race and marital status were included as control variables, because they are established predictors of smoking behaviors (Cho, Khang, Jun, & Kawachi, 2008; Hu, Davies, & Kandel, 2006; Laaksonen, Rahkonen, Karvonen, & Lahelma, 2005). Males served as the reference group for gender. Age was measured continuously, but all ages above age 85 were top coded to age 85 in the CHIS. Income was measured as

annual household income in thousands of dollars. The CHIS top coded all responses greater than \$300,000, as \$300,000. Consequently, the highest income value, in thousands of dollars, was 300. Years of education were originally coded into broad categories that included: no formal education, 1–8 years, 9–11 years etc. However, these were recoded to represent values in the middle of each category to create a continuous variable. Race/ethnicity was measured using a series of dummy variables (i.e. non-Latino white, non-Latino Black, non-Latino Asian, non-Latino other race and Latino). Non-Latino whites served as the reference category. Marital status was measured using a series of dummy variables (i.e. married, never married and other). Married individuals served as the reference group. To test moderated effects, interaction terms were created between each of race, age, educational attainment and social cohesion.

2.3 Analyses

All analyses were conducted using Stata 13.1, using 80 replicate weights. First, descriptive statistics were run (Table 1). Next, two logistic regressions were run: the first modeled the association between social cohesion and current smoking status and the second modeled the association between social cohesion and if smoking is allowed in households (Table 2). Both models controlled for sociodemographic characteristics. These two models were then rerun with one with one of the three previously described interaction terms at a time. While it is common practice to present hierarchical models that sequentially add variables and compare coefficients across models, this method was not utilized as it is not appropriate for logistic regression due to problems inherent with the rescaling of the outcome variable (Mood, 2010).

3. Results

As Table 1 shows, weighted sample characteristics demonstrated that the sample was mostly female, on average under 40 years old, married and had a little more than a high school education. Latinos comprised the largest racial/ethnic group (44%), with non-Latino whites comprising about a third of the sample. Average household income was almost \$74,000 per year. The average social cohesion level was almost 8 out of 15, indicating moderate levels of social cohesion. Finally, a minority of the sample was currently smoking (13%) or lived in a household where smoking was allowed (3.7%).

Table 2 shows the results of models predicting current smoking status and household smoking after controlling for sociodemographic characteristics. Model 1 shows that each one-unit increase in social cohesion is associated with an 8% reduction in odds of being a current smoker (AOR= 0.92; 95% CI= 0.85–0.99). Model 2 shows that each one-unit increase in social cohesion is associated with a 16% reduction in odds of living in a household in which smoking is allowed (AOR= 0.84; 95% CI= 0.75–0.93). Race, gender, household income and marital status were associated with both current smoking status and household smoking.

Moderation analyses (not shown) revealed that relationships were not conditional on educational level, race/ethnicity or age for being a current smoker. In terms of smoking in

the household, the effect of social cohesion increased with age (AOR= 1.01; 95% CI= 1.00–1.01), but was not conditional on educational attainment or race/ethnicity.

4. Discussion

The present study uses data from the nation's largest state health survey to assess the relationship between the social environment and smoking behavior by looking at a novel mechanism, social cohesion. Moreover, the study provides a unique contribution to the literature by focusing on adults residing with children. Consistent with previous research higher levels of social cohesion were associated with lower levels of smoking (Alcantara et al., 2014; Andrews et al., 2014; Holmes & Marcelli, 2014; Li & Delva, 2011, 2012; Li et al., 2012). The moderating effect of age on household smoking may be attributable to the fact that the older one is, the more likely one is to be a parent relative to younger respondents, and thus more sensitive to his/her social environment because more than just the self is at stake. Overall, findings not only highlight how the neighborhood social environment is related to adult behavior but also reveal how social cohesion may have implications for modeling smoking behavior and exposing children to environmental tobacco smoke (ETS).

The social environment is an important influence on smoking behavior. Modeling of smoking by adult figures is a key concern considering consistent findings that social networks, comprised of family members and peers, are associated with smoking initiation among youth (Bricker, Peterson, Andersen, et al., 2006; Bricker, Peterson, Leroux, et al., 2006; Melchior et al., 2010; Peterson et al., 2006). There are multiple pathways through which smoking behavior may influence a child's decision to initiate smoking. First, modeling influences children's values and attitudes such that children exposed to smoking may not only view it as appropriate, and not a threat to their health, but may smoke in order to increase their acceptability within their social networks (Schuck et al., 2012). Second, children in households with a smoking adult may have easier access to cigarettes thereby facilitating their own smoking behavior.

There are, however, limitations that should be considered when interpreting the results. First, this study is cross-sectional, and thus temporality cannot be determined. As a result, it is not possible to ascertain whether smoking influences the levels at which individuals interact with their neighbors or perception of social cohesion. Second, although the concept of social cohesion is measured frequently at the individual and neighborhood level (Andrews et al., 2014; Patterson et al., 2004), publically available data from the CHIS does not permit neighborhood level analyses. As such, the present findings can be expanded using multi-level analyses. Third, the study data was collected between 2009–2010, and therefore calls for studies using more recent data to reflect current trends between social cohesion and smoking behaviors. Lastly, these data do not describe the respondent's relationship with the household child(ren), the number of children in the household or the age of children who are present. That is, it is not possible to assess whether the association varies by respondent-child relationship (i.e. biological/step-parent or other parental figure, other kin etc.) or by characteristics of the child. The CHIS also does not provide data on familial history of smoking. Future studies that incorporate such information could enhance our understanding of this phenomenon.

5. Conclusions

Despite these limitations, the current findings may be used to inform interventions to decrease smoking rates and health consequences of ETS by considering the role of social cohesion. For example, community interventions can focus on fostering relationships between diverse community stakeholders and their constituents as a strategy to improve social cohesion. Improving social cohesion can facilitate higher levels of civic engagement and/or trust among community members that may translate into promising effects related to smoking such as bolstering shared goals to advocate for anti-smoking policies. Moreover, because social cohesion is thought to increase compliance to norms and increase social support, promoting social cohesion may help people follow anti-smoking norms and increase the resources available within the social environment to those smokers that want to quit. At the minimum, this study highlights the merit of future programs that assess social cohesion in the communities they work in and how it may influence the impact it may have on their goal(s), including decreasing smoking rates.

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Highlights

1. Social cohesion was inversely associated with odds of current smoking.
2. Social cohesion was inversely associated with odds of living in homes allowing smoking.
3. The relationship between social cohesion and allowing smoking in the household increased with age.

Table 1

Summary Statistics for CHIS 2009 Analytic Sample (N=13,978)

Characteristic	Level	N	Unweighted		Weighted	
			Percent or Mean	Percent or Mean	Percent or Mean	Robust SE
Race	White	6,537	46.77%	35.61%	0.01	
	Latino	4,461	31.91%	44.08%	0.01	
	Black	566	4.05%	5.14%	0.00	
	Asian	1,993	14.26%	12.95%	0.00	
Gender	Other	421	3.01%	2.22%	0.00	
	Male	5,578	39.91%	46.81%	0.01	
	Female	8,400	60.09%	53.19%	0.01	
Age		13,978	41.87	38.24	0.16	
Years of Education		13,978	13.51	12.67	0.05	
Household Income ^a		13,978	80.33	73.93	0.75	
Social Cohesion		13,978	8.14	7.91	0.03	
Current Smoker	No	12,293	87.95%	87.00%	0.01	
	Yes	1,685	12.05%	13.00%	0.01	
Household Smoking	No	13,455	96.26%	96.30%	0.03	
	Yes	523	3.74%	3.70%	0.03	
Marital Status	Married	9,497	67.94%	64.22%	0.75	
	Never Married	1,705	12.20%	19.03%	0.60	
	Other	2,776	19.86%	16.75%	0.70	

Note: Totals may not sum to 100% due to rounding.

^aIn thousands of dollars.

Logistic Regression Models Predicting Smoking Status and Household Smoking from Social Cohesion, CHIS 2009 (N=13,978)

Table 2

Independent Variable	Level	Model 1 Current Smoker			Model 2 Household Smoking		
		AOR	95% CI	p	AOR	95% CI	p
Social Cohesion ^a		0.92	(0.86 – 0.99)	*	0.84	(0.75 – 0.93)	**
Race	non-Latino white	–	–	–	–	–	–
	Latino	0.41	(0.32 – 0.52)	***	0.31	(0.19 – 0.50)	***
	African American	0.83	(0.55 – 1.24)		1.68	(1.02 – 2.78)	*
	Asian	0.50	(0.33 – 0.76)	**	0.87	(0.47 – 1.59)	
	Other	1.55	(0.97 – 2.47)		0.77	(0.38 – 1.55)	
Gender	Male	–	–	–	–	–	–
	Female	0.43	(0.34 – 0.53)	***	0.66	(0.48 – 0.90)	*
Age		1.00	(0.98 – 1.01)		1.02	(1.00 – 1.04)	**
Years of education		0.97	(0.94 – 0.99)	*	0.99	(0.96 – 1.03)	
Household income ^b		0.99	(0.99 – 1.00)	***	1.00	(0.99 – 1.00)	*
Marital Status	Married	–	–	–	–	–	–
	Never Married	1.13	(0.79 – 1.60)		3.96	(2.41 – 6.51)	***
	Other	1.52	(1.16 – 1.97)	**	1.80	(1.27 – 2.58)	**
Model Statistics							
F		14.47		***	10.48		***
df		11, 69			11, 69		

Note: AOR= adjusted odds ratio;

* .05.

** .01.

*** .001.

^a Social cohesion scores ranged from 0 to 15, with higher values indicating higher cohesion.^b In thousands of dollars.