RESEARCH ARTICLE

Teachers and Coaches in Adolescent Social Networks Are Associated With Healthier Self-Concept and Decreased Substance Use

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——————————— **ABSTRACT** ———————————

BACKGROUND: Poor academic (eg, ''I am a bad student'') and behavioral (eg, ''I am a troublemaker'') self-concepts are strongly linked to adolescent substance use. Social networks likely influence self-concept. However, little is understood about the role teachers and athletic coaches play in shaping both academic and behavioral self-concepts.

METHODS: We analyzed cross-sectional surveys of 929 9th-12th grade low-income minority adolescents in Los Angeles assessing self-concept, social networks, and 30-day use of alcohol, marijuana and other drugs. We performed generalized estimating equations, accounting for clustering at the school level and controlling for family and peer influences and contextual factors. We also tested whether self-concept-mediated associations between relationships with teachers or coaches and 30-day substance use.

RESULTS: More perceived teacher support was associated with lower odds of marijuana and other drug use and better academic and behavioral self-concepts. Behavioral self-concept mediated the associations between teacher support and substance use.

CONCLUSIONS: By facilitating relationships with adults and improving teachers' capacity to build supportive environments, schools may positively shape how adolescents see themselves, which might help reduce adolescent substance use.

Keywords: adolescents; substance use; self-concept; social networks.

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Self-concept (role-identity, self-perceived competence in different domains) is an important, modifiable factor associated with substance use and other risky adolescent health behaviors.[1-8] Studies show that those teens with poor behavioral and academic self-concept have higher rates of substance use,[1,3,5] risky sexual activity,[4] and other problem behaviors,[2,7,8] as well as poor academic performance.[9-13] As opposed to general self-concept and self-esteem, academic and behavioral self-concept domains are more consistently linked with health behaviors.[14] In other words, teens who think of themselves as ''poor students'' or ''rule-breakers,'' are more likely to engage in risky health behaviors. In addition, self-concept has been shown to moderate peer influence such that students with healthy self-concept profiles appear less susceptible to pro-drug peer influence.[2] Although the causal relationship between self-concept and risky health behaviors has not been fully established, evidence suggests that changes in self-concept precede changes in

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substance use,[15] and that interventions targeting self-concept can successfully reduce substance use.[16,17] These findings suggest that self-concept might serve as an efficient target to prevent risky adolescent health behaviors.

Whereas self-concept presents exciting possibilities for prevention, less is known about how to support its healthy development. Studies suggest that adolescence is a critical time for identity development and self-concept solidifies during late adolescence for most young people.[18] Experts believe self-concept is influenced by feedback (both explicit and implicit) about an individual's strengths and weaknesses in different domains.[9,19] It has been recognized that students' experiences in school shape academic self-concept.[20] However, few studies investigate the role schools might also play in shaping behavioral self-concept.

Social Influence Theory suggests social networks are a key driver of adolescent health behaviors.[21] One mechanism through which social networks might impact health is by shaping how teens see themselves and develop their self-concept.[6] Whereas the focus of social networks is often on peers and families, other adult actors and the quality of their relationships with adolescents may also be important in promoting positive health outcomes.[22] Much of our understanding regarding protective non-relative adult influences stems from evaluations of mentoring and positive youth development programs.[23] However, little is known about how ordinary non-relative adult actors impact adolescent identity formation, in the context of their larger social network. In addition, there is growing recognition that school environments might shape both adolescent self-concept and health behaviors.[11,24-27] Understanding how school-related adults, such as teachers and athletic coaches, might influence aspects of self-concept linked to health behaviors may help identify potential leverage points for intervention.

To address this gap we sought to determine whether (1) relationships with teachers and coaches were associated with academic and behavioral self-concept among a sample of low-income urban, minority adolescents; and (2) self-concept mediated the associations between teacher or coach relationships and adolescent substance use.

METHODS

We conducted a secondary data analysis of the Reducing Health Inequities Through Social and Educational Change (RISE) Study.[28] This was a cross-sectional survey of 934 youth who participated in admissions lotteries to attend high-performing public charter schools in low-income Los Angeles communities between 2007 and 2010. Both students who were admitted to the charter schools and those who were not admitted were included in the study, originally designed to test whether exposure to high-performing schools was associated with improved health behaviors. Students in 9th-12th grade completed one 90-min face-to-face computer-assisted interview during the 2010-2011 school year. An audio-enhanced, computer-assisted self-interview was used to collect information on sensitive topics related to substance use and sexual behaviors. Finally, at the end of the survey, participants were asked to name 20 people in their social network. For each individual named, they were asked to describe their relationship and that individual's academic and health behaviors.

Participants

Among the 1238 students recruited for the study, 308 declined to participate for a participation rate of 75.1%. Of those enrolled in the study, 100% completed the survey. One participant only answered the demographic questions and that record was dropped, resulting in an overall analytic sample of 929 participants.

Measures

Measures were selected to capture socially important relationships across the school, family and peer domains, and to control for factors previously associated with both self-concept and substance use.

Self-concept. We focused on academic and behavioral domains of self-concept, as they are most consistently linked to risky health behaviors. Behavioral self-concept was measured via the behavioral conduct subscale of the Harter Self-Perception Profile of Adolescents (HSPPA), a self-concept tool validated in multiple adolescent populations.[29] The HSPPA consists of 5 items scored from 1 to 4 and averaged together, with higher scores signifying healthier self-concept profiles. The subscale sample mean was consistent with means in similar adolescent samples,[29] and the alpha coefficient was 0.69. For academic self-concept we used a 7-item index assessing self-perceived academic competence (alpha = 0.81 in this sample). Students were asked how much they agreed or disagreed with statements such as, "I take pride in my schoolwork," and "I have the skills and ability to complete my work." The resulting score also ranges from 1 to 4 with higher scores suggesting a healthier self-concept. Subscale scores were then standardized such that a 1-U difference corresponded to a difference of 1 SD.

Relationships with teachers and coaches. To measure students' perceptions regarding their social support from teachers, students were asked how much they agreed or disagreed with 9 statements about teacher support. A total of 4 statements focus generally on teacher support for student achievement, such as teachers helping students plan for college outside of

class and teachers feeling that it is their job to pre-
pare students to succeed in college. A total of 5 items
address the student's own experience with teachers,
such as "they help if I have trouble learning some-
thing," and "they help me catch up if I am behind in
class." Each item was scored from 1 to 4 and all 9 items
were averaged together to generate on overall score
with higher scores reflecting more perceived teacher
support. The Cronbach's alpha for this scale was 0.85
in our sample. For ease of interpretation, this scale was
standardized such that a 1-U difference corresponds to
a difference of 1 SD. In addition, to capture teens' per-
sonal relationships with adults at school we included
the number of athletic coaches and the number of
teachers named in each participant's social network.

Family measures. Parenting style was measured via
the Index of Parenting Style,[30] which assesses the level
of acceptance/involvement and strictness/supervision
that adolescents perceive their parents to exhibit.
On the basis of adolescent responses, parents were
categorized as indulgent, neglectful, authoritative,
authoritarian, or mixed (reference category).

We also included 2 measures of perceived parental
values related to academic and behavioral competence.
Participants were asked what each of their parents
thought was the most important thing to do after
high school. Based on their responses we categorized
participants as perceiving that all (both parents in
a 2-parent family; single-parent), some (1 out of 2
parents) or none of their parents thought the most
important thing for them to do after high school
was to attend college. Participants were also asked
how much their parents would approve or disapprove
of them using tobacco, alcohol, and marijuana at
this time in their life (strongly approve to strongly
disapprove). Adolescents who said their parents would
strongly disapprove of them using all 3 substances
were dichotomized as perceiving high parental value
of behavioral competence. A sensitivity analysis using
a continuous parental approval for substance use score
yielded similar results. To account for the negative
family role models with respect to behavior, we
included a dichotomous measure of whether 1 or more
of each participant's parents ever used illicit drugs.

Peer measures. We included measures of both pos-
itive and negative peer modeling regarding academic
and health behaviors. These measures included the
proportion of peers named in a participant's social net-
work who engaged in alcohol use, cigarette use, and
other drug use in the last month and the proportion
of peers named in the social network who had sexual
intercourse. Because correlation between these items
was moderate to high, values were summed to create
an index of risky peer behavior (alpha = 0.75). For ease
of interpretation the index was standardized such that
a 1-U difference corresponds to a difference of 1 SD.

To measure perceived peer value of academic
competence, for each peer named in participant's
social network, participants were asked how much
they agreed or disagreed that the peer "thinks that
it is important to do well in school," "thinks that is
it important to attend every class," and "tries hard
in school." We calculated the proportion of peers
named in the social network for whom the participant
agreed with each statement and then summed these
values to create an index of perceived peer value for
academic competence (alpha = 0.77). Once again, this
index was standardized on the mean and SD of our
sample. To measure negative academic peer modeling,
we calculated the proportion of peers named in the
social network who the respondent reported "causes
or gets into trouble at school." Participants were also
asked how many of their close friends had dropped
out of school. On the basis of distribution of responses
we created an indicator for having 1 or more close
friends who had dropped out. A sensitivity analysis
using the number of friends who had dropped out of
school yielded similar results.

Substance use. Participants were asked how many
times they drank alcohol, used marijuana, and used
any other drug in the last 30 days. A report of any of
these behaviors was considered a positive dichotomous
measure of alcohol use, marijuana use, and other drug
use, respectively.

Additional covariates. We selected additional
covariates for their potential to impact adoles-
cents' relationships with teachers or coaches and
self-concept. These included sex, grade level, race-
ethnicity (Latino vs. non-Latino), student-reported
household income (less than $15,000/year, $15,000-
$29,000/year, $30,000-$49,000/year, $50,000/year or
more, and unknown), and student-reported parental
level of education, which was dichotomized as high
school graduate or not based on the distribution of
responses.

In addition, academic performance, both individ-
ually and relative to one's peers, is thought to have
a reciprocal relationship with self-concept, and may
also determine aspects of a teen's social network. As
a result, we controlled for the Academic Performance
Index (API) growth score of the participants' school
and their self-reported grade point average. The API
is based on the California Standards Test (score range:
200-1000).[31]

Data Analysis
    To determine the associations between relationships
with teachers and coaches and self-concept domains
we used generalized estimating equations to account
for nonindependence of students clustering within
schools, controlling family and peer factors, and addi-
tional demographic covariates. We used the Karlson,

Holm, and Breen (KHB)-method to test for mediation along with generalized estimating equations of 30-day alcohol, marijuana, and other drug use, respectively, on relationships with teachers and coaches and self-concept, controlling for demographic covariates, to determine whether self-concept mediated the associations between teacher or coach relationships and adolescent substance use.[32] Because the KHB method does not take into account hierarchical data, we performed the mediation test using logistic regressions. A sensitivity analysis comparing the estimated odds ratios resulting from generalized estimating equations and logistic regression models revealed similar results. Data were analyzed using STATA (version 12, StataCorp, College Station, TX). Missing data were multiply imputed and represented less than 5% for all variables in the analysis. A sensitivity analysis using nonimputed data yielded similar results.

RESULTS

The demographics (Table 1) are representative of low-income neighborhoods in Los Angeles with the majority of students identifying as Latino (84%). Nearly 40% came from families earning less than $30,000 a year, and for just over half the sample, the highest level of parental education was less than a high school degree. About 45% of the sample was comprised of boys, with equal representation from 9th to 12th graders, and just under 50% attended a charter school. Most parents displayed a mixed parenting style (63%), but over 15% exhibited neglectful parenting. Further, while a large majority of participants (86%) reported that their parents highly valued academic competence, nearly 37% perceived low parental value of behavioral competence, and over 11% reported that at least 1 parent used illicit drugs. Just over 10% of the sample named a coach, and 37% named a teacher in their social network, with the number of these adults ranging from 0-5 to 0-8, respectively. Fewer girls (6.9% versus 13.9%, p < .001) and charter school students (8.8% versus 11.3%, p < .001) named a coach in their network. Most students perceived a high level of teacher support, as the teacher support scale ranged from 1.8 to 5 with a mean of 4.3. Approximately one third of respondents reported using alcohol, over 20% reported marijuana use, and 6% reported other illicit drug use in the previous 30 days.

Respondents reported relatively risky peer networks. Approximately half of participants reported no peers in their social network who try hard in school (48.6%) or who think it is important to attend every class in school (49.6%), and 62.9% named no peers who think it is important to do well in school. Over 84% of participants reported that most of the peers named in their network were not disruptive in class, but over 40% reported that a close friend

Table 1. Demographics

	Percent (N)/Mean (Range)
Age in years	16.4 (13.9-19.5)
Male	44.7% (415)
Female	55.3% (514)
Race ethnicity	
Latino	84.0% (780)
African American	12.6% (117)
Other race/ethnicity	3.4% (32)
School setting	
Public Charter	49.5% (460)
Traditional Public	43.7% (406)
Other school setting	4.8% (45)
Dropout	1.9% (18)
Grade	
9th	25.9% (241)
10th	24.4% (227)
11th	25.8% (240)
12th	23.8% (221)
Household income	
$50,000 or more	15.1% (140)
$30,000-49,000	20.5% (190)
$15,000-29,000	25.8% (240)
Less than $15,000	12.6% (117)
Income unknown	26.1% (242)
Parent graduated from high school	50.7% (471)
School API Score	717.4 (380-977)
Grade point average	
<2.0	7.1% (66)
2.0-2.5	20.9% (194)
2.6-3.0	23.0% (214)
3.1-3.5	24.4% (227)
3.6-4.0	19.8% (184)
Behavioral self-concept score	2.9 (1-4)
Academic self-concept score	3.4 (1.9-4)

had dropped out of school. On average, respondents reported that 30% of their named peers had ever had sexual intercourse, and that 23% had used alcohol, 5% had smoked cigarettes, and 15% had used other drugs in the last 30 days.

Generalized estimating equations modeling academic and behavioral self-concept were conducted separately. For academic self-concept (Table 2), higher perceived teacher support was associated with higher academic self-concept (beta = 0.33, p < .001). In addition, there was a positive correlation between the number of teachers named in a social network and academic self-concept that did not quite meet statistical significance (p = .07). Parenting style was also significantly associated with whether teens saw themselves as good students or poor students. Specifically, neglectful, and authoritarian parenting styles were associated with lower academic self-concept scores (beta = −0.23, p = .001 and beta = −0.21, p = .02, respectively) and authoritative parenting style was associated with higher academic self-concept scores (beta = 0.24, p = .002), relative to mixed-style parenting. In addition, perceiving a low parental

Table 2. **Multivariate Regressions of Academic Self-concept on Relationships With Teachers and Coaches, Controlling for Family, Peer, and Individual Factors** *

| Predictors | Academic Self-Concept | | |
	Coefficient	95% CI	p-Value
School			
Perceived teacher support	**0.33**	**0.28** to **0.38**	**<.001**
Coaches named in social network	−0.03	−0.12 to 0.07	.581
Teachers named in social network	0.03	−0.00 to 0.07	.07
Family			
Neglectful parenting style	**−0.23**	**−0.38** to **−0.09**	**.001**
Authoritative parenting style	**0.24**	**0.09** to **0.38**	**.002**
Indulgent parenting style	−0.05	−0.26 to 0.16	.627
Authoritarian parenting style	**−0.21**	**−0.39** to **−0.03**	**.02**
Parent used illicit drugs	−0.12	−0.28 to 0.04	.148
Perceived parental approval for substance use	0.00	−0.11 to 0.10	.963
Low perceived parental value of academic competence	**−0.67**	**−0.97** to **−0.38**	**<.001**
Medium perceived parental value of academic competence	0.11	−0.04 to 0.26	.16
Peer			
Peer risky behavior index	0.01	−0.06 to 0.07	.839
Peer school engagement	**0.46**	**0.31** to **0.60**	**<.001**
Having friends who dropped out of school	0.01	−0.09 to 0.12	.809
Proportion of disruptive peers	−0.04	−0.29 to 0.21	.772
Covariates			
Interview date	0.00	−0.00 to 0.00	.285
Grade level	**0.06**	**0.01** to **0.11**	**.015**
Male	−0.02	−0.12 to 0.08	.735
Black race	**0.21**	**0.05** to **0.38**	**.009**
Other race/ethnicity	0.13	−0.15 to 0.41	.365
Income < $15,000	0.02	−0.17 to 0.21	.802
Income $15,000-29,000	0.12	−0.04 to 0.29	.129
Income $30,000-49,000	**0.19**	**0.02** to **0.35**	**.025**
Income unknown	0.07	−0.10 to 0.24	.408
One or more parents graduated high school	**−0.15**	**−0.26** to **−0.05**	**.004**
School's Academic Performance Index (API)			
Bottom Tercile	0.05	−0.08 to 0.18	.472
Middle Tercile	0.13	−0.02 to 0.28	.087
No API score	0.15	−0.08 to 0.38	.192
Grade point average			
<2.0	**−0.98**	**−1.21** to **−0.76**	**<.001**
2.0-2.5	**−0.60**	**−0.76** to **−0.45**	**<.001**
2.6-3.0	**−0.45**	**−0.60** to **−0.30**	**<.001**
3.1-3.5	**−0.22**	**−0.37** to **−0.08**	**.002**
GPA not reported	**−0.78**	**−1.03** to **−0.52**	**<.001**

Statistically significant values are represented in bold.
*Model accounts for clustering at the school level.

value of academic competence was associated with lower academic self-concept (beta = −0.67, p < .001). Having a peer network that was more engaged in school was associated with higher academic self-concept (beta = 0.46, p < .001), but there were no other significant peer factors.

Table 3 shows the results of the model for behavioral self-concept. Both higher levels of perceived teacher

Table 3. **Multivariate Regressions of Behavioral Self-Concept on Relationships With Teachers and Coaches, Controlling for Family, Peer, and Individual Factors** *

| Predictors | Behavioral Self-Concept | | |
	Coefficient	95% CI	p-Value
School			
Perceived teacher support	**0.13**	**0.06** to **0.19**	**<.001**
Coaches named in social network	**0.13**	**0.02** to **0.25**	**.02**
Teachers named in social network	0.01	−0.04 to 0.05	.788
Family			
Neglectful parenting style	−0.15	−0.32 to 0.03	.097
Authoritative parenting style	**0.24**	**0.06** to **0.42**	**.008**
Indulgent parenting style	0.00	−0.25 to 0.26	.971
Authoritarian parenting style	−0.21	−0.42 to 0.01	.056
Parent used illicit drugs	−0.04	−0.24 to 0.15	.657
Perceived parental approval for substance use	−0.09	−0.22 to 0.03	.154
Low perceived parental value of academic competence	−0.19	−0.55 to 0.17	.298
Medium perceived parental value of academic competence	0.03	−0.16 to 0.21	.788
Peer			
Peer risky behavior index	**−0.13**	**−0.21** to **−0.05**	**.001**
Peer school engagement	0.15	−0.02 to 0.33	.089
Having friends who dropped out of school	**−0.23**	**−0.36** to **−0.10**	**<.001**
Proportion of disruptive peers	**−0.35**	**−0.65** to **−0.05**	**.022**
Covariates			
Interview date	**0.00**	**0.00** to **0.00**	**.04**
Grade level	**0.07**	**0.01** to **0.13**	**.022**
Male	−0.04	−0.16 to 0.09	.552
Black race	0.04	−0.15 to 0.24	.67
Other race/ethnicity	−0.16	−0.50 to 0.18	.368
Income < $15,000	0.06	−0.17 to 0.29	.614
Income $15,000-29,000	0.06	−0.14 to 0.25	.579
Income $30,000-49,000	0.12	−0.08 to 0.32	.233
Income unknown	0.17	−0.03 to 0.38	.091
One or more parents graduated high school	0.00	−0.13 to 0.13	.985
School's Academic Performance Index (API)			
Bottom Tercile	0.09	−0.08 to 0.25	.303
Middle Tercile	0.07	−0.11 to 0.25	.456
No API score	0.13	−0.15 to 0.40	.372
Grade point average			
<2.0	**−0.38**	**−0.65** to **−0.10**	**.007**
2.0-2.5	**−0.40**	**−0.59** to **−0.21**	**<.001**
2.6-3.0	**−0.19**	**−0.38** to **−0.01**	**.037**
3.1-3.5	−0.06	−0.23 to 0.12	.527
GPA not reported	**−0.56**	**−0.87** to **−0.25**	**<.001**

Statistically significant values are represented in bold.
*Model accounts for clustering at the school level.

Table 4. Associations Among Perceived Teacher Support, 30-Day Substance Use, and Self-Concept *

	30-Day Alcohol Use		30-Day-Marijuana Use		30-Day Other Drug Use	
	OR (95% CI)	p-Value	OR (95% CI)	p-Value	OR (95% CI)	p-Value
Reduced Model 1						
Teacher Support	0.87 (0.74-1.01)	.08	**0.76 (0.64-0.92)**	**.003**	**0.61 (0.46-0.81)**	**.001**
Reduced Model 2						
Academic Self-Concept	0.91 (0.76-1.09)	.29	**0.79 (0.64-0.98)**	**.03**	0.74 (0.53-1.02)	.07
Behavioral Self-Concept	**0.64 (0.54-0.76)**	**<.001**	**0.54 (0.44-0.65)**	**<.001**	**0.37 (0.27-0.52)**	**<.001**
Full Model						
Teacher Support	0.98 (0.82-1.18)	.89	0.92 (0.75-1.14)	.44	0.74 (0.53-1.03)	.08
Academic Self-Concept	0.91 (0.74-1.11)	.34	0.82 (0.65-1.04)	.10	0.84 (0.58-1.20)	.34
Behavioral Self-Concept	**0.64 (0.54-0.76)**	**<.001**	**0.54 (0.44-0.66)**	**<.001**	**0.38 (0.27-0.53)**	**<.001**
Percent of the association with teacher support mediated by self-concept for each outcome						
Academic Self-Concept	27.6%		28.4%		12.7%	
Behavioral Self-Concept	61.7%		43.5%		34.2%	

Statistically significant values are represented in bold.

*All models account for clustering at the school level and control for demographic covariates including interview date, gender, grade level, race-ethnicity, household income, parental level of education, grade point average, and school API.

support (beta = 0.13, p < .001) and naming more coaches in one's social network (beta = 0.13, p = .02) were associated with healthier behavioral self-concept scores. Similar to academic self-concept, authoritative parenting style was associated with higher behavioral self-concept (beta = 0.24, p = .008). In addition, more risky peer networks (beta = −0.13, p = .001), having at least 1 close friend who had dropped out of school (beta = −0.23, p < .001), and the proportion of peers in the network who caused trouble at school (beta = −0.35, p = .02) were all associated with lower behavioral self-concept scores.

We then conducted a mediation analysis to determine whether 1) teacher support and the number of coaches named in a network were significantly associated with 30-day alcohol, marijuana and other drug use; and 2) these associations with substance use were mediated by self-concept. As Table 4 shows, we found that higher levels of perceived teacher support were associated with lower odds of marijuana

[odds ratio (OR) = 0.76, p = .003] and other drug use (OR = 0.61, p < .001) in the reduced model. However, after adding self-concept, the full model revealed that these relationships were no longer significant (OR = 0.92, p = .44 for marijuana use; OR = 0.74, p = .08 for other drug use). Using the KHB method to quantify this difference demonstrated that associations between teacher support and substance use were reduced 12.7-28.4% by academic self-concept and 34.2-61.7% by behavioral self-concept, suggesting that self-concept, particularly the behavioral conduct domain, mediated the relationship between teacher support and 30-day substance use.

Naming more athletic coaches in one's social network was significantly associated only with lower odds of marijuana use (OR = 0.63, p = .04) in the reduced model. Once again, after adding self-concept, this association was no longer significant. KHB analysis demonstrated that academic self-concept mediated 0.7% and behavioral self-concept mediated 19%

Table 5. Associations Among Number of Coaches Named in the Social Network, 30-Day Substance Use, and Self-Concept*

	30-Day Alcohol Use		30-Day-Marijuana Use		30-Day Other Drug Use	
	OR (95% CI)	p-Value	OR (95% CI)	p-Value	OR (95% CI)	p-Value
Reduced Model 1						
Number of coaches	1.13 (0.86-1.49)	.39	**0.63 (0.40-0.99)**	**.04**	0.92 (0.45-1.87)	.81
Reduced Model 2						
Academic Self-Concept	0.91 (0.76-1.09)	.29	**0.79 (0.64-0.98)**	**.03**	0.74 (0.53-1.02)	.07
Behavioral Self-Concept	**0.64 (0.54-0.76)**	**<.001**	**0.54 (0.44-0.65)**	**<.001**	**0.37 (0.27-0.52)**	**<.001**
Full Model†						
Number of coaches	1.21 (0.90-1.61)	.20	0.67 (0.42-1.14)	.09	1.04 (0.49-2.18)	.93
Academic Self-Concept	0.90 (0.75-1.08)	.27	**0.78 (0.63-0.97)**	**.02**	0.73 (0.53-1.02)	.07
Behavioral Self-Concept	**0.64 (0.54-0.76)**	**<.001**	**0.53 (0.44-0.65)**	**<.001**	**0.37 (0.27-0.52)**	**<.001**

Statistically significant values are represented in bold.

*All models account for clustering at the school level and control for demographic covariates including interview date, gender, grade level, race-ethnicity, household income, parental level of education, grade point average and school API.

†KHB analysis demonstrated that academic self-concept mediated 0.7% and behavioral self-concept-mediated 19% of the association between number of coaches and marijuana use.

of the association between coaches and marijuana use (Table 5).

We also tested mediation in the reverse direction—ie, whether teacher support or the number of named coaches mediated the association between self-concept and substance use. Teacher support mediated up to 43.2% of the associations between academic self-concept and substance use but only up to 2.1% of the associations between behavioral self-concept and substance use. The number of named coaches mediated only 3.4% of the association between academic self-concept and marijuana use and 2.9% of the association between behavioral self-concept and marijuana use.

DISCUSSION

Adolescence is typically considered a time when peers and parents engage in a contest for influence. We found, however, that positive interactions with adults at school (teachers and athletic coaches) were also significantly associated with healthier academic and behavioral self-concept, even after controlling for family factors, peer influence, and individual academic achievement. Relationships with coaches, which are likely to focus more on general behavior rather than academic competence, was associated with behavioral self-concept, while teacher support was associated with both academic and behavioral self-concept. This suggests that school-related adults in adolescent social networks might significantly influence how teens develop their sense of self. Our findings build on previous work demonstrating that social support is associated with healthier self-esteem and predicts improved academic achievement over time by increasing academic self-concept;[33-35] and that both healthier self-concepts and more social support from adults are associated with lower rates of substance use.[5] Our results extend this work by identifying specific school-related adults, namely teachers and coaches, who might meaningfully influence the development of both academic and behavioral self-concept—domains closely tied to adolescent substance use. In particular, the strong association between relationships with school-related adults and behavioral self-concept is a new finding which might, if confirmed, explain 1 mechanism through which school environments shape adolescent health behaviors.

Together, these findings point to schools as potential platforms for self-concept interventions, suggesting that the influence of teachers and coaches might be leveraged to help adolescents develop a healthy sense of self and avoid risky health behaviors. By providing teens with opportunities to connect with supportive adults in and out of the classroom, the school environment itself might be harnessed to prevent risky health behaviors.

The importance of personal mentoring relationships is consistent with the literature on positive youth development, which sees building adolescent competence and self-image as core aspects of health promotion. In fact, studies suggest adult mentoring might reduce risky health behaviors in part through changes in adolescent self-concept.[16,36,37] Education policy-makers have explored structural aspects of a school environment, such as smaller schools and lower student load on teachers, that might foster better teacher-student relationships and ultimately raise school performance.[38] Such strategies may also prove useful in impacting student health by supporting behavioral self-concept and reducing risky health behaviors. In addition, preserving or even expanding opportunities for students to engage with adults through sports programs and other extracurricular activities might further support healthy adolescent self-concept. Child advocates, including pediatricians and educators, might work together to buttress these school-related assets, particularly during times of economic crisis and intensifying pressure on schools to narrow their focus.

This study is limited by the cross-sectional design, which makes it impossible to determine whether factors present in the social networks precede self-concept or are causally related to self-concept. While it is conceivable that self-concept impacts relationships with adults at school rather than vice versa, we found that self-concept (particularly behavioral self-concept) mediated the associations between relationships with teachers and coaches and substance use much more strongly than teacher or coach relationships mediated the associations between self-concept and substance use, suggesting that reverse causality is less likely. Further, our analysis controls for academic performance, which would likely mediate a causal pathway from self-concept to perceived teacher support or relationships with coaches. Given that relationships with coaches was not consistently associated with substance use, it is possible that the association between number of coaches named in the network and marijuana use is spurious, and should be confirmed in future studies. The large proportion of charter school students in our sample may have led to less exposure to coaches, as some of the sample schools do not support large athletics programs, and it is possible that the ability of coaches to change health behaviors depends on unmeasured factors, including strength and size of the athletic programs, cultural emphasis on sports in schools, and the visibility of coaches on campus. In addition, although our analysis controls for many likely confounders, we cannot exclude the possibility that there remains unmeasured confounding variables. In particular, we could not

account for personality traits or social status, which might influence self-concept, relationships with adults, and substance use. In addition, all data are self-reported and potentially biased by social desirability. Finally, given the largely low-income, Latino sample, from a single urban center, our findings might not generalize to other sociodemographic, ethnic, or regional populations.

IMPLICATIONS FOR SCHOOL HEALTH

Despite these limitations these findings have important implications for schools and school-based health professionals working to reduce risky adolescent health behaviors. Our findings support the notion that school-related adults, particularly teachers and coaches, play a critical role in shaping how teens see themselves. School-based clinicians might explore whether their adolescent patients have developed supportive relationships with these school-related adult assets, particularly for high-risk patients, and help facilitate and strengthen those connections to promote adolescent health. Educators might play close attention to how they communicate their personal investment in the students they work with. Parents, educators, and child health advocates might all work to ensure that families, schools, and communities consciously provide students with opportunities to develop mentoring relationships with adults both in the classroom and through extracurricular activities. Such opportunities might be strengthened by investing in lower class sizes, lower total student load, and additional extracurricular opportunities. Finally, given the importance of the school environment, school health professionals might partner directly with school administrations to implement self-concept interventions in the interest of improving academic and health outcomes.

Human Subjects Approval Statement

This study was approved by the human subjects Institutional Review Board of the University of California, Los Angeles (IRB# 11-002463).

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