Using Social Network Analysis to Clarify the Role of Obesity in Selection of Adolescent Friends

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Objectives. We used social network analysis to examine how weight status affects friend selection, with an emphasis on homophily and the social marginalization of overweight youths.

Methods. We used an exponential random graph model to assess the effects of body mass index (BMI) on friend selection while controlling for several alternative selection processes. Data were derived from 58 987 students in 88 US middle and high schools who took part in the 1994 to 1996 National Longitudinal Study of Adolescent Health.

Results. On average, overweight youths were less likely than nonoverweight youths to be selected as a friend; however, this effect differed according to the BMI of the person initiating the friendship. Nonoverweight youths were 30% more likely to select a nonoverweight friend than an overweight friend, whereas overweight youths were largely indifferent to the weight status of their friends. Friendship ties from overweight youths to nonoverweight peers were more likely than ties in the reverse direction.

Conclusions. We found evidence consistent with homophily and social marginalization but only for the selection behavior of nonoverweight youths. We conclude that avoidance of overweight friends is the primary determinant of friendship patterns related to BMI. (*Am J Public Health.* 2014;104:1223–1229. doi: 10.2105/AJPH.2013.301768)

Social network analysis offers a tool to understand the complex social and biological relationships that contribute to health.[1–3] A tenet of the social network paradigm is that individual behaviors are interdependent owing to processes such as normative influences, social learning, and contagion.[4–6] At the same time, network structure is not independent of behavior. Networks are dynamic, complex systems in which ties (e.g., friendships) are constantly evolving in conjunction with individual behaviors.

Network selection processes are in part driven by individuals' health,[7] often including the very health behaviors that researchers treat as outcomes.[8–10] However, several other processes also contribute to network structures. Friendships are more likely when individuals share commonalities with respect to sociodemographic attributes (i.e., homophily[11]), organizational affiliations,[12] spatial proximity,[13] and social connections (i.e., transitivity[14]). Also, individuals systematically vary in their sociability and popularity.[15] Fully understanding health behavior thus requires an examination of network structures and the processes that create them.

Several explanations have been invoked to understand the complex role of obesity in structuring friendships among young people. Two explanations in particular have received concerted attention. First, overweight adolescents are socially marginalized and less likely to be selected as a friend than their nonoverweight peers.[9,16–18] This is troubling given that friendships are important sources of support and companionship throughout the life span.[19] Not having or losing friends is associated with increased depression and decreased self-worth among young people, which could exacerbate the health problems associated with being overweight.[20] These negative repercussions of friendlessness may be more pronounced in middle school and high school, when intimacy and fitting into peer groups are critical.[20,21]

Second, adolescents tend to develop friendships with peers who have a similar body mass index (BMI).[8,16,22,23] Friendships that are homophilous with respect to weight create the possibility for peer influence on behaviors and beliefs associated with weight. Friendships among overweight adolescents may reinforce unhealthy behaviors that further exacerbate weight problems.[24]

Investigations of social marginalization and homophily have often been pursued independently, which we argue is a mistake. These patterns represent different perspectives on the more general question of how weight shapes friendship patterns. By adopting a network perspective, we recognize that the friend selection process depends on both the person initiating friendship (ego) and the friendship target (alter). Friendship likelihood can differ depending on the combination of ego and alter weight status. Assuming, for the sake of simplicity, that weight status is dichotomous, there are 4 types of friend selection dyads: overweight ego selecting overweight alter, nonoverweight ego selecting nonoverweight alter, overweight ego selecting nonoverweight alter, and nonoverweight ego selecting overweight alter.

Examining marginalization requires that researchers compare friendship ties directed toward overweight versus nonoverweight alters, which disregards the ego's weight status. By contrast, focusing solely on homophily entails comparing friendship dyads that are similar versus dissimilar, without considering whether the adolescents are overweight or nonoverweight. Examining either mechanism in isolation risks misidentifying the process underlying friend selection behaviors.

A network approach demonstrates the interrelation between marginalization and homophily. Although the mechanism behind each pattern differs (e.g., avoidance of as opposed to preference for similarity), both predict that nonoverweight adolescents are more likely to befriend nonoverweight peers than overweight peers (Table 1). The mechanisms differ in their predictions regarding the selection behaviors of overweight adolescents. The avoidance mechanism posits that

TABLE 1—Expected Friendship Likelihood Based on Avoidance and Homophily Mechanisms

	Avoidance			Homophily	
	Alter non-OV	Alter OV		Alter non-OV	Alter OV
Ego non-OV	High	Low	Ego non-OV	High	Low
Ego OV	High	Low	Ego OV	Low	High

Note. OV = overweight. Ego refers to the person initiating the friendship; alter is the recipient.

overweight adolescents avoid overweight peers, instead choosing nonoverweight friends, whereas the homophily mechanism posits that overweight adolescents prefer overweight friends. By highlighting this distinction, we are better positioned to investigate the operation of these mechanisms.

The network approach also makes clear that friend selection is multifaceted. Associations between friendship and weight status could develop indirectly through friend selection processes other than homophily or marginalization.[25] The first of these processes is social withdrawal of overweight adolescents. Overweight adolescents may be less sociable than nonoverweight adolescents, possibly because of perceived stigma[26] or lower rates of involvement in school-based activities that promote friendship.[21] Second, selection may occur on attributes correlated with weight, such as depression. Overweight adolescents may be excluded because of aversive behaviors that accompany their weight status, not because of weight itself.

Third, the endogenous nature of network evolution means that the current network structure promotes some ties over others in the future. For instance, triad closure occurs when 2 individuals become friends because they have a mutual acquaintance. Consider person A, whose nonoverweight friend B has no overweight friends. Should person A form a friendship with any of person B's friends through triad closure, those friendships will not include overweight peers. Thus, small tendencies toward homophily can become magnified over time.[27] Failure to control for alternative friend selection processes can result in biased parameter estimates.[15,28,29] Because of the equifinality of network structure, each of these processes could produce social marginalization or homophily as a spurious outcome.

Our goal in this study was to offer a more detailed account of how weight status predicts friendship patterns, with an eye on homophily and the social marginalization of overweight youths. We addressed this goal by modeling friendship network data collected in several middle and high schools. Our models estimated effects related to BMI while controlling for alternative friend selection mechanisms.

METHODS

In our investigation, we included 58 987 students in 88 middle and high schools who took part in the National Longitudinal Study of Adolescent Health (Add Health), conducted from 1994 to 1996. Schools with response rates below 75% or insufficient variability with respect to BMI (because of small overall school size) were dropped from the original sample of 132 schools. The sample was 51% female and racially/ethnically diverse, and participants were 15 years of age on average (Table 2).

All data other than data on BMI were drawn from the adolescent questionnaire administered at the participant's school during wave 1. Information on BMI was collected during the in-home interview conducted approximately 8 months later. Because the in-home interview targeted only a quarter of the in-school sample, BMI data were available for only 20% of students. We retained students with missing BMI data and adjusted for these missing data in our model, allowing us to include network and covariate information from a larger sample of students.

Body Mass Index

Self-report measures of height and weight were used to compute adolescents' BMI percentile specific to their age and gender.[30] Adolescents were categorized into one of the 4 Centers for Disease Control and Prevention weight status categories according to their BMI percentile: underweight (below the 5th percentile), healthy weight (5th percentile to 85th percentile), overweight (85th percentile to 95th percentile), or obese (95th percentile or above). We compared overweight (i.e., overweight and obese) adolescents with nonoverweight adolescents in our analyses.

Friendship Network

Adolescents identified their 5 closest female and 5 closest male friends (up to 10 friends in total). Nominations of out-of-school friends were not considered because we did not have data on such friends. We treated network ties as directed, allowing us to differentiate how BMI relates to sending versus receiving friendship ties.

TABLE 2—Descriptive Statistics for Students and Schools: National Longitudinal Study of Adolescent Health, 1994–1996 (n = 59 987)

Characteristic	Sample, No. (%) or Mean ±SD
Students	
Overweight	2999 (25)
Female	29 600 (51)
Age, y	15.00 ±1.71
Race	
White	32 132 (55)
Hispanic	9542 (16)
Asian	3247 (6)
Black	8964 (15)
Other	4084 (7)
Grade	9.59 ±1.61
Grade point average	1.79 ±0.81
Depression score	0.38 ±0.55
No. of sport activities	1.20 ±1.41
No. of nonsport activities	0.97 ±1.42
No. of incoming friendships	4.47 ±3.71
Schools	
No. of students	670 ±501
Percentage of overweight students	25 ±7
Type	
Middle	33 (38)
Middle/high	17 (19)
High	38 (43)
Reciprocity score	0.39 ±0.06
Triad closure score	0.21 ±0.07

Control Variables

Obtaining unbiased estimates of the associations between friendships and adolescents' health requires that other potential predictors be controlled.[10,31] We controlled for several demographic and behavioral factors that predict friendships and are related to BMI, including gender, race, grade level, grade point average (GPA), depression, and activity participation (descriptive statistics are provided in Table 2).

Gender was coded dichotomously (0 = male, 1 = female), grade level ranged from 6 to 12, and race/ethnicity was a categorical measure (White, Black, Hispanic, Asian, or other). We calculated GPA by computing the average of students' self-reported grades in English, math, social studies, and science in the preceding year (0 = D, 3 = A). Depression was based on 4 items derived from the Center for Epidemiologic Studies Depression Scale ($\alpha = 0.71$).[32] Two measures were used to indicate involvement in school-based extracurricular activities: number of sport activities (0–13) and number of nonsport activities (0–18).

Data Analysis

We used an exponential random graph model (ERGM) to assess how BMI affects friend selection.[15,33] This model predicts the likelihood of a tie based on individual, dyadic, and local network properties. The outcome of the model is dichotomous: the presence or absence of a tie for each possible dyad. All models include an *edges* term to represent the baseline probability of a tie.

We were particularly interested in 3 independent variables related to BMI. The *BMI nodematch* term captures the effect of the tie sender (ego) and recipient (alter) having the same BMI status (i.e., both overweight or both nonoverweight) on tie likelihood. The *BMI outdegree* term captures differences in the likelihood of nominating others according to whether the ego is overweight. The *BMI indegree* term captures how being overweight affects one's likelihood of being nominated as a friend by others. Because of high rates of missing BMI data, we estimated these same 3 effects for a dummy variable indicating whether the individual was missing information on BMI. This procedure ensured that the reference group for the effects related to overweight consisted of only nonoverweight adolescents. Because these controls are of no substantive interest, their estimates are not reported here (they are available from the first author).

Similar terms were included as controls for other individual attributes. The control variables had relatively low rates of missing data (3.7% on average); thus, we used the school mean to impute missing values. Accordingly, we treated each control variable as a continuous measure and, instead of using nodematch to assess similarity, we used the *absdiff* term, which measures absolute differences between members of each dyad. We expected larger absolute differences to reduce the likelihood of ties, resulting in negative coefficient estimates. An exception was made for race/ethnicity, which truly is a categorical measure. Here we specified missing values as their own category and used the nodematch term, allowing coefficient estimates to differ across categories.

One advantage of ERGMs is that they allow one to control for network processes that also drive structure. The indegree and outdegree effects control for the distributions of incoming and outgoing ties in the network, respectively. The *edgewise shared partners* term estimates the likelihood of a tie based on the number of partners linking the 2 individuals. The *dyadwise shared partners* term controls for the likelihood of individuals without a tie sharing multiple partners. Each of the 4 aforementioned network terms is geometrically weighted, allowing better estimation of models.[34] Finally, the *reciprocity* effect captures the tendency to reciprocate friendship nominations.

The ergm package in R version 3.1 (R Foundation for Statistical Computing, Vienna, Austria) was used in estimating models. We fit each model specification separately by school and then conducted a meta-analysis to combine results.[35]

RESULTS

We begin with 2 preliminary models that tested whether the patterns expected from the avoidance and homophily mechanisms were present. Our first preliminary model estimated the likelihood of overweight students being selected as a friend. Consistent with the avoidance mechanism, the BMI indegree coefficient was negative (b = –0.23; 95% confidence interval [CI] = –0.27, –0.19; $P < .001$), indicating that overweight students were less likely than nonoverweight students to be chosen as a friend. The estimated coefficient represents the change in the log odds of a friendship for alters who are overweight versus not overweight. Exponentiation revealed that the odds of selecting an overweight friend were 79% ($e^{-0.23}$) of the odds of selecting a nonoverweight friend, or 21% lower.

Our second preliminary model estimated the likelihood of students selecting a friend with the same weight status as themselves. Consistent with homophily, the estimated BMI nodematch coefficient was positive (b = 0.14; 95% CI = 0.10, 0.18; $P < .001$). Students were 15% ($e^{0.14}$) more likely to befriend a peer whose weight status matched their own than to befriend a peer with a different weight status.

The preliminary models indicated that both the homophily and marginalization patterns were present. However, what we really want to know is how likely friendships were for each combination of ego and alter BMI. This goal required that we simultaneously model all 3 BMI effects: BMI nodematch, indegree, and outdegree. Model 1 included only these 3 effects, whereas models 2 and 3 also included controls for endogenous selection mechanisms (model 2), homophilous selection on individual attributes (models 2 and 3), and indegree and outdegree based on individual attributes (model 3). Ideally, we would include all controls in 1 model; however, problems with model convergence prevented that. Instead, we present multiple model specifications and compare results.

As shown in Table 3, the 3 BMI effects were significant in all models, with 1 exception. That multiple BMI effects were significant means that the likelihood of a tie depended on both the ego's and the alter's BMI. This makes direct interpretation of individual coefficient estimates difficult. To ease interpretation, we calculated odds ratios comparing the likelihood of different types of ties. We evaluated the model for each dyad type holding all other effects constant, which gave us the log odds for each dyad type. To compare 2 dyad types, we exponentiated the log odds for each, which provided us the odds needed to construct an odds ratio. We calculated the odds of overweight adolescents selecting similar versus dissimilar friends, nonoverweight adolescents

TABLE 3—Results of the Meta-Analysis of Exponential Random Graph Models: National Longitudinal Study of Adolescent Health, 1994–1996 (n = 88 Schools)

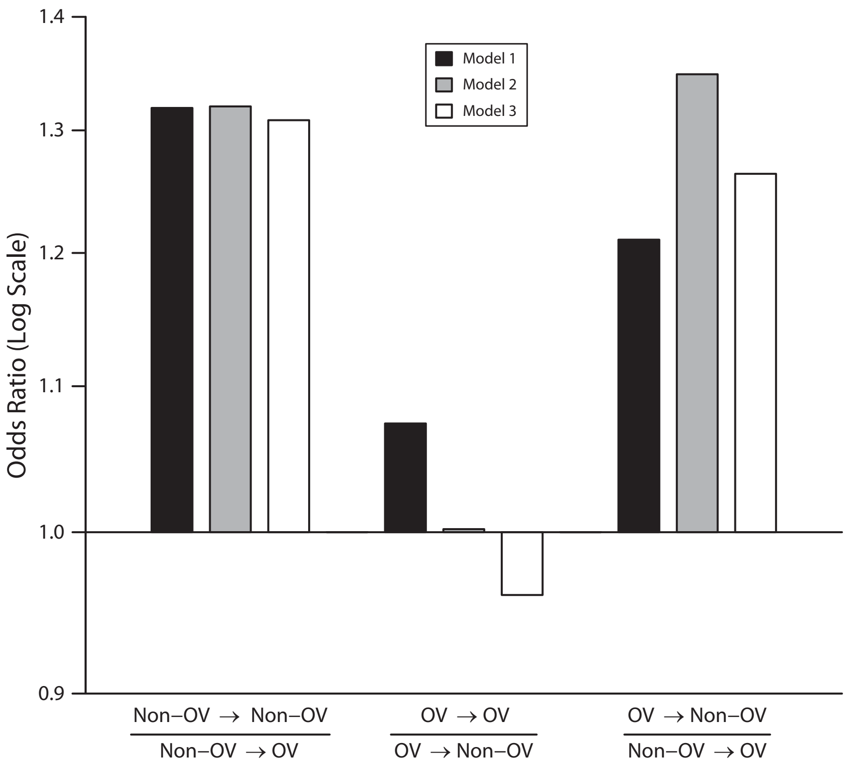
	Model 1, b (SE; 95% CI)	Model 2, b (SE; 95% CI)	Model 3, b (SE; 95% CI)
Edges	−4.66*** (0.11; −4.88, −4.44)	−3.53*** (0.09; −3.71, −3.35)	−5.04*** (0.20; −5.43, −4.65)
BMI indegree	−.10*** (0.03; −0.16, −0.04)	−0.16** (0.06; −0.28, −0.04)	−0.14*** (0.02; −0.18, −0.10)
BMI outdegree	0.09*** (0.02; 0.05, 0.13)	0.08 (0.06; −0.04, 0.20)	0.16*** (0.02; 0.12, 0.20)
BMI homophily[a]	0.17*** (0.02; 0.13, 0.21)	0.11* (0.05; −.01, 0.21)	0.14*** (0.02; 0.10, 0.18)
Dyadic homophily			
Gender (female)[b]		0.04** (0.02; 0.00, 0.08)	−0.25*** (0.02; −0.29, −0.21)
White[a]		0.08** (0.03; 0.02, 0.14)	0.60*** (0.07; 0.46, 0.74)
Hispanic[a]		0.60*** (0.07; 0.46, 0.74)	0.67*** (0.06; 0.55, 0.79)
Asian[a]		0.99*** (0.27; 0.46, 1.52)	1.27*** (0.05; 1.17, 1.37)
Black [a]		0.19*** (0.06; 0.07, 0.31)	1.26*** (0.06; 1.14, 1.38)
Other race[a]		0.38*** (0.11; 0.16, 0.60)	0.45*** (0.03; 0.39, 0.51)
Grade[b]		−0.60*** (0.01; −0.62, −0.58)	−1.38*** (0.05; −1.48, −1.28)
GPA[b]		−0.16*** (0.02; −0.20, −0.12)	−0.21*** (0.01; −0.23, −0.19)
Depression[b]		0.01 (0.02; −0.03, 0.05)	−0.09*** (0.01; −0.11, −0.07)
Sport activities[b]		−0.03*** (0.01; −0.05, −0.01)	−0.11*** (0.01; −0.13, −0.09)
Nonsport activities[b]		0.00 (0.01; −0.02, 0.02)	−0.11*** (0.01; −0.13, −0.09)
Endogenous network processes			
Reciprocity		2.83*** (0.09; 2.65, 3.01)	3.93*** (0.09; 3.75, 4.11)
Indegree (GW)		−0.61*** (0.08; −0.77, −0.45)	
Outdegree (GW)		−1.52*** (0.05; −1.62, −1.42)	
Edgewise shared partners (GW)		1.63*** (0.00; 1.63, 1.64)	
Dyadwise shared partners (GW)		−0.13*** (0.00; −0.14, −0.12)	
Outgoing ties			
Gender (female)			0.08*** (0.02; 0.04, 0.12)
Grade			−0.12*** (0.02; −0.16, −0.08)
GPA			-0.01 (0.01; -0.03, 0.01)
Depression			0.00 (0.01; −0.02, 0.02)
Sport activities			0.06*** (0.01; 0.04, 0.08)
Nonsport activities			0.08*** (0.01; 0.06, 0.10)
Incoming ties			
Gender (female)			-0.03 (0.02; −0.07, 0.01)
Grade			0.17*** (0.01; 0.15, 0.19)
GPA			0.02 (0.01; 0.00, 0.04)
Depression			0.14*** (0.02; 0.10, 0.18)
Sport activities			0.12*** (0.01; 0.10, 0.14)
Nonsport activities			0.09*** (0.01; 0.07, 0.11)

Note. BMI = body mass index; CI = confidence interval; GPA = grade point average; GW = geometrically weighted.
[a]Nodematch effect indicates the likelihood of a tie based on whether dyad members match exactly on the attribute.
[b]Absdiff is the absolute difference between dyad members; negative coefficients indicate homophily (greater differences decrease the likelihood of ties).
*P < .05; **P < .01; ***P < .001 (2-tailed tests).

selecting similar versus dissimilar friends, and overweight adolescents selecting nonoverweight friends versus nonoverweight adolescents selecting overweight friends. The first 2 odds ratios captured homophily, whereas the latter odds ratio indicated whether there was an asymmetry in friend selection in mixed-BMI dyads.

Figure 1 presents these odds ratios calculated from models 1 through 3. The first set of bars represents the odds of homophilous selection for nonoverweight youths. These odds ratios all exceeded 1, indicating that nonoverweight adolescents were more likely to select nonoverweight friends than they were to select overweight friends. The range of odds ratios suggests that homophilous friendships among nonoverweight youths were 31% to 32% more likely. This pattern is expected according to both the avoidance and homophily mechanisms.

The middle set of odds ratios represents homophilous selection for overweight youths.



Note. The → symbol represents friend selection (e.g., OV → OV = overweight adolescent choosing an overweight friend).

FIGURE 1—Predicted odds ratios comparing the likelihood of a friendship between 2 peers on the basis of being overweight (OV) or nonoverweight (Non-OV): National Longitudinal Study of Adolescent Health, 1994–1996.

The reduced model indicates a slight tendency toward homophily among overweight youths (model 1). However, when controls were included, the odds ratios dropped to near or below 1 (models 2 and 3, respectively). An odds ratio below 1 indicates that overweight adolescents were less likely to select overweight friends than nonoverweight friends (i.e., they were more likely to select friends who differed from themselves). According to model 3, overweight adolescents were 4% less likely to select an overweight than a nonoverweight friend. On the basis of models 2 and 3, which included controls, we conclude that homophilous preferences did not exist among overweight youths. Instead, overweight youths either had a slight tendency to avoid overweight friends or were indifferent regarding their friends' weight status.

Finally, the right-hand set of bars indicates that the odds of overweight adolescents selecting nonoverweight friends were greater than the odds of nonoverweight adolescents selecting overweight friends. The odds of a tie from an overweight adolescent to a nonoverweight friend were 21% to 35% greater than a tie in the opposite direction. Thus, there was an asymmetry within mixed-BMI dyads, with nonoverweight adolescents being selected more often on average. This pattern was not attributable to the greater proportion of nonoverweight adolescents because the model conditioned on the distribution of BMI in the population. This asymmetry is not expected from the homophily mechanism, which posits that adolescents in mixed-BMI dyads should mutually avoid one another. However, this pattern is consistent with avoidance, whereby overweight adolescents prefer nonoverweight friends but are not chosen as friends in return.

DISCUSSION

The goal of this study was to offer a detailed account of how adolescent weight status affects friend selection. Using a social network approach, we tested how the weight status of the person initiating the friendship and the weight status of the friendship target combine to affect friendship likelihood. We found strong associations between BMI and friendships that persisted net of controls for other important friend selection processes. Our study produced 3 main findings.

First, we found consistent evidence that nonoverweight youths chose nonoverweight friends more often than they chose overweight friends. This pattern is consistent with both the homophily and avoidance mechanisms. Second, overweight adolescents were indifferent regarding the weight status of their friends. This pattern defies the direct expectations of both the homophily and avoidance mechanisms. Third, overweight adolescents were more likely to choose nonoverweight peers as friends than they were to receive friendship nominations in return. This pattern is consistent with a status hierarchy in which all individuals, regardless of their own attributes, prefer friends with particular attributes (e.g., not being overweight, being popular[36]). This effect implies the presence of a fair number of unreciprocated friendships, which is suggestive that in mixed-BMI dyads the relationship is perceived to be stronger by the overweight member.

These findings offer insight into the generative mechanisms behind network structures. If homophily were the operant process, then we would expect a pattern of preferential selection among both nonoverweight and overweight youths because there is no barrier to such selection behaviors. Yet, this is not what we observed: overweight youths were indifferent to their friends' weight.

By contrast, the avoidance mechanism contains an inherent barrier to achieving desired friendships. Namely, because this mechanism posits that overweight individuals are avoided by others, overweight adolescents who befriend nonoverweight peers are unlikely to have their friendship reciprocated. If overweight adolescents also avoided one another, they could potentially be left friendless. However, one response to social marginalization is to adjust one's friendship standards.[37,38] Overweight youths whose friendship overtures are not reciprocated may begin to turn to overweight peers instead, resulting in the pattern of indifference we observed. This suggests that when avoidance operates, it may be weaker among individuals, such as overweight youths, who are lower in status. Altogether, these findings imply that avoidance was the primary mechanism responsible for the observed friendship patterns.

Strengths

Social network analysis has the advantage of being able to evaluate the contributions of multiple generative mechanisms to friendship network structures. We were able to control for several factors confounded with BMI that may have led to finding social marginalization or homophily spuriously. Properly identifying the mechanisms behind friend selection is important for understanding the consequences of friendship patterns and can help in the design of more promising prevention and intervention programs.[39] Because avoidance was one of the primary determinants of friendships among overweight youths, intervention strategies aiming to support the development of these young people should consider the ramifications of social marginalization. Many marginalized youths adopt problematic coping strategies, such as drug use and disengagement from school, to deal with not being part of the school peer group.[21]

Our findings also have implications for efforts in which simulations are used to model the spread of obesity in social networks and evaluations of intervention attempts.[40] Simulations are only as good as their assumptions. Ignoring homophily and social marginalization related to obesity could lead to erroneous conclusions regarding the effectiveness of intervention strategies.[41] Our approach can help inform simulations by using observed networks to help specify the probabilities of different types of ties and, although not our focus, how tie probabilities differ across contexts. Moreover, the microlevel focus of the ERGM lends itself to incorporation within an agent-based modeling framework, offering promise in linking 2 important systems science methods.[2]

Because of the difficulty in gathering network data, social network analyses are often constrained to one or only a small handful of schools. Although fundamental friend selection processes appear to generalize across network contexts, there remains concern over inadequate power to detect weaker or contextualized effects.[42] By using the Add Health data, we were able to examine networks in several dozen school contexts and more reliably identify friendship patterns related to BMI.

Limitations

A chief limitation is that the Add Health data we used were cross sectional. Although these cross-sectional data enabled us to examine the processes in question in a larger number of schools than with the longitudinal data (i.e., 88 vs 2 schools), we still cannot infer causality in the associations between BMI and friendships. Models exist to disentangle the direction of influence,[9] but they require longitudinal data on entire networks and BMI. Such data do not exist for a large number of schools within the Add Health study.

A second limitation is that the data are close to 20 years old. Although we do not expect that most friend selection processes have changed, obesity rates have increased, not only among children but among parents who serve as role models.[24] This increased prevalence may have lessened the stigma associated with being overweight. Even if this is true, it remains likely that BMIs exceeding the 85th percentile, our cutoff for overweight, continue to carry a stigma that manifests itself during friend selection.[21]

Finally, our measure of BMI was imperfect in that it was based on self-reported height and weight, and BMI measurements were taken approximately 8 months after information on friendship networks had been gathered. Both of these issues can increase the error associated with our estimates. In addition, BMI data were missing for 80% of our sample. Because our models accounted for these missing data, our estimates related to BMI are unbiased. However, our results would be even more precise if BMI data were available for the full sample.

Conclusions

Network analysis offers a powerful tool to understand the complex selection processes responsible for the social relationships that help shape health behaviors. Although previous findings indicating homophily and social marginalization among overweight youths are accurate at the descriptive level, they are incomplete. By taking a detailed look at how BMI affects friend selection, we conclude that homophily and social marginalization are outcomes of a more general tendency to avoid overweight peers as friends. ■

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Contributors

Both of the authors conceptualized the study. D. R. Schaefer conducted the analysis and led the writing.

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Human Participant Protection

No protocol approval was necessary because we used secondary data from the National Longitudinal Study of Adolescent Health.

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