THE ROLE OF SOCIAL CAPITAL IN HUMAN CAPITAL INVESTMENT: A SOCIAL NETWORK APPROACH TO COLLEGE SUCCESS IN THE FIRST YEAR

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Record numbers of Americans are pursuing postsecondary education, yet graduation rates have not kept pace. In an emerging 21st-century "networked information economy" (Benkler, 2006), this represents a major national challenge. Higher education researchers see the problem as one of retention or persistence (Braxton, 2000). This research frames it instead in terms of the academic success that results from investment in human and social capital. A promising tool for "operationalizing" social capital (e.g., Lin, 2001), social network analysis was used to study two networks involving 67 small-college freshmen: an affiliation network derived from group memberships and a study-tie network based on reported study partners.

Both networks were studied visually and statistically. The affiliation network was heavily connected and dense, while the study-tie network was chain-like with more isolated individuals and fragments. When redundant ties were ignored, however, the two networks differed little in effective size. High-achieving students tended to be part of the principal network component, while low achievers were often isolated. When freshmen were ranked by GPA, high achievers tended to have larger ego networks in the first term and occupy structural holes, while low achievers had fewer but stronger ties and were more constrained.

Multiple regression models were used to explore further the effects of individual attributes and network measures on first-term (FGPA) or year-end cumulative (CGPA) grades; however, given independence assumptions of the regression model, this was strictly exploratory. At the end of the fall, tie strength in both networks was negatively correlated with FGPA. Ego network size was positively correlated with academic performance in the study network, and ego betweenness was similarly correlated in the affiliation network. By year's end, high school class rank dominated models, and network effects dissipated. Ego betweenness continued to have a modest, positive effect on grades in the affiliation network; higher constraint scores were negatively related to grades in both networks.

Freshman dropouts and retainees were also compared. Returning students tended to have more direct and two-step study ties, and considered their ties more important. In concluding sections, limitations to and proposals for research were outlined, and practical advice offered on learning communities, admissions, financial aid, and the pivotal first term.

GLOSSARY

The following terms are common in social network analysis. Although the definitions are the author's, Wasserman and Faust (1994) and Scott (2000) were both relied on heavily.

Adjacency matrix The matrix equivalent of a network diagram. In the matrix, network actors are represented in the same order in rows and columns, and existence of a tie between two actors is represented by a non-zero digit, often a "1". Tie absence is recorded as "0".

Alters In an individual's ego (personal) network, the other individuals to whom the individual is linked are that person's alters.

Betweenness The extent to which a particular individual (network node) lies on the shortest paths (geodesics) between other individuals.

Bridge A line (tie) in a network that, if removed, results in two separate and smaller networks; a line connecting two subnetworks or subgraphs.

Centrality A network actor with many ties to others has greater centrality. The classic example would be a node at the center of an asterisk- or star- like network that is linked to all surrounding nodes.

Component A part of a network (subgraph) in which there is some kind of path between every pair of nodes.

Cutpoint A node (or point, individual) that, if removed from the network results into separate and smaller networks (the node-equivalent of a bridge).

Degree The number of ties a network actor has; in graph terms, the number of lines entering or leaving a point.

Density The proportion of total possible ties in a network that actually exists. A four-node graph has six possible ties between points; if three of those ties exist, the network's density would be 3 / 6, or .50 or 50%.

Dichotomize Ties in a network and the accompanying adjacency matrix can be valued, e.g., by their strength, intensity, or importance. Or, they can carry binary values: "1" for presence of a tie and "0" for absence. When a matrix is "dichotomized," tie values are converted to 1-0 form.

Dyad (triad) A pair of actors, linked or not, e.g., a coupled joined by marriage or two girls tied by friendship. A triad is the same but with three actors.

Ego (network) The individual of interest in a network; the nodes and ties that the specific individual has constitute the ego network.

Egocentric An egocentric network is one that consists of the focal individual (ego) together with all the nodes he or she can reach through existing ties.

Geodesic The shortest path over existing ties between two nodes.

Graph A network diagram of points (nodes) and lines (ties).

In-/out- degree In a network where ties are bidirectional, in-degree is the number of lines entering a node (and out-degree is the number leaving). An individual named as a friend by five others has an in-degree of five.

Isolate A network node with no ties, i.e., an individual without links to others.

K-core A subgraph in which each point is adjacent to at least k other points.

Node An individual in a network; in graph terms, a point, connected or not, in a network diagram.

Sociocentric Unlike an egocentric network, a sociocentric one includes all possible nodes and ties.

Sociogram In the 1930's, Jacob Moreno used this to refer to a network graph or diagram and socieometry to refer to the study of such diagrams, respectively.

Tie A relationship between two network actors; in graph terms, a line between two nodes.

Two-step reach An individual often has friends who in turn have friends. These "friends of friends" can be a valuable social resource, and the number of them that an individual has constitute that a person's two-step reach.