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Social skills, nonverbal sensitivity and academic success. The key role of centrality in student networks for higher grades achievement

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Abstract

Previous researches proved that highly interpersonal sensitive people are popular among their peers and have better grades than low interpersonal sensitive ones. Those researches focused mainly on primary and secondary education and suffered from construct validity of the 'popularity' concept. We suggest a new way to measure popularity using Social Network Analysis and we refer mainly to network centrality as an indicator of the subject's relational capital. The present research suggests that student relational resources could be useful also for the tertiary education, mainly college education and students' centrality especially in the academic-related networks could be a key factor in predicting their academic grades in the end of the semester. We found the nonverbal sensitivity skills are correlated with individuals' centrality in non-academic related networks, as for example 'asking for financial support network' and do not correlate with centrality in the academic-related networks. Being central in the academic-related networks, especially in the 'exchange of information' network, significantly increased student chances in get higher grades in the end of the semester.

Keywords: nonverbal sensitivity; academic achievement; social networks; centrality.

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Introduction

The ability to interact with others – colleagues, members of the same team work, subordinates, clients and so on – and generally speaking to establish and maintain social contacts and to predict or influence others behavior is nowadays considered not only part of individual's personal success but also a dimension of professional success. The importance of social skills in predicting the output of human interactions has been largely debated in social psychological literature for the past 20 years (Bandura, 1997; Saarni, 1999; Carton, Kessler & Pape, 1999; Hess & Philippot 2007; Greene, & Burelson, 2008; Spitzberg, 2008). This concept is generally described as a constant behavioral adjustment to others, a process of mutual adaptation and accommodation with certain assertive value, where individuals define flexible goals relative to groups gaining rewards and achieving social status. However, the insolated influence of social competence over the specific analyzed outputs would be difficult to prove mostly because the concept itself is broad and context related (Ivan, 2008; Ivan, 2009). This paper considers two dimensions of the social skills: nonverbal sensitivity, as the ability to decode nonverbal messages and to use nonverbal cues for estimate others emotions, attitudes or behavioral intentions (Hall & Bernieri, 2001) and also individual's popularity and prominence in their groups.

People's nonverbal sensitivity has been already related with performances on different tasks. For example those who had recognized basic emotions when presented on a quarter of a second have had also better performances in distinguishing stimulus persons who lied or told the truth (Ekman & O'Sulivan, 1991). A recent study (Hall, Roter, Blanch & Frankel, 2009) analyzed the quality of doctor-patient interactions in clinical settings, proving that future doctors who had received higher scores on standardized test to assess nonverbal sensitivity were less distressed more engaged, and appreciated during a standard patient visit. Other studies (Hall & Bernieri, 2001; Butovskaya, Timentschik, & Burcova, 2007) have proved that nonverbal sensitive people are more emphatic and tolerant; they adjust easier to groups and engaged more in positive interpersonal relations or helping behavior proving to be successful in supervisor – assessments, negotiation or sales-occupations. Similar researches on educational institutions to correlate nonverbal sensitivity with academic achievements are scarce and they lack construct validity. Either they refer more to academic self-confidence or adjustment and not really to academic grades as a measure of student performances in school, or they are not really measuring nonverbal sensitivity with standardized instruments but with informant-based reports on individual' social skills in general. For example a study conducted on Hispanic teenagers leaving in US (Acoach & Webb, 2004) proved that the ability to decode nonverbal elements – due to their brokering language perspective – is increasing their academic self-confidence and as a result their school performances as well. Recently, a longitudinal

study following 4-5 years of age children until the fifth grade (Konold, Jamison, Stanton-Chapman & Rimm-Kaufman, 2010) argued that social skills are valid predictors of student' achievements, especially in applied problems and letter-word identification. However in this research work, social skills were measured by both teachers and mothers reports and do not specifically refer to ability of decode nonverbal cues. Therefore, the following research question will test the influence of nonverbal sensitivity on academic success:

RQ: Is there any relation between students' accuracy in decoding nonverbal elements, measured by standardized tests and they academic achievements, measured by grades they received in the end of the semester?

When testing people's nonverbal sensitivity one challenge is to a find a valid approach to measure it. The pioneer work of Rosenthal and his colleagues (1979) have produced one of first standardized instruments to assess nonverbal sensitivity: The Profile of Nonverbal Sensitivity test (PONS). It consists of 220 two second paralinguistic or visual slides representing 20 affective interpersonal situations enacted by the same female encoder. Other similar measurements as for example The Interpersonal Perception Task IPT, Contanzo & Archer, 1988) or The Diagnostic Analysis of Nonverbal Accuracy (DANVA, Nowicki & Marshall, 1994) are also widely quoted in the literature.

A study conducted on four hundred fifty-six elementary school children (Nowicki & Marshall,1992) using DANVA to measure nonverbal sensitivity, proved that subjects who were better in nonverbal cues decoding on face and tone of the voice were also more popular and more likely to have higher academic grades. This research work suggests that the positive correlation between nonverbal sensitivity and academic success could be mediated by student's prominence among classmates, as a relational capital. The authors explain the findings by saying that elementary school learning is mostly an interpersonal process, with different tasks pupils have to perform in front of their teachers or classmates and therefore misinterpreting others subtle cues and being unpopular could be followed by lower grades. The question remains if such a relation between nonverbal sensitivity, popularity and academic grades could be also found in college or generally speaking in adult educational institutions. When interpreting data we should consider also the fact that the relation between variables could work both ways: those already proving high academic achievements could become popular among their peers, they would often be chosen as interaction partners, at least in support or information exchange ties, this resulting in higher nonverbal skills.

Whether nonverbal sensitivity individuals are also popular in groups has been previously tested in the literature. Using subjects aged between 5 and 12, two similar studies (Hubbard & Coie, 1994; Boyatzis & Satyaprasd 1994) argued that children having higher abilities to decode emotions enjoy more appreciation among their peers, are more actively involved in playing with others in groups

and better in negotiating interaction frustrating situations. Previously gather data on preschool children (Walden, & Field, 1990) had also showed that highly nonverbal sensitive subjects were preferred as interaction partners and easily accepted in groups. Researches conducted on adults although they are scarce mainly confirm the results obtained on children: students with better performances in emotional decoding reported more relationships well-being (see Carton, Kessler & Pape, 1999).

One methodological problem of the studies mentioned above is the way popularity in groups has been measured, by appealing to relevant others evaluations and not having a structural approach over the real position of the individual relative to the other members of the group. Researches conducted on children and adolescents assessed popularity in groups according to teachers or parents evaluations and even to individuals' self-evaluation. In only one of the above mentioned studies (Nowicki & Marshall, 1992) subjects' popularity was measured using a sociometric approach: children were asked to name three peers from their classroom they like the most and to draw a line through three others they like the least, this creating in the end a total score or 'liked' or 'not like' for each individual participated in the research. However, the relation between nonverbal sensitivity and subjects' prominence in the social networks has not been discussed as such. We suggest an analysis of the interconnection between nonverbal sensitivity, popularity and academic success based on relational data, using Social Network Analysis.

SNA enables researchers to have a visual representation of different types of ties (e.g. exchange of information, support, friendship, trust) in a specific social network and to quantify the importance of each involved actor relative to others or to the entire network density or connectivity. Thus social networks are seen as sources of individuals' constrains or opportunities in achieving specific goals and Social Network Analysis as a assembly of tools to assess people prominence, collaborations and efficiency in the social structures they are part of (Wasserman & Faust, 1994). The most important actors in the network – actor's popularity – is defined in SNA by 'centrality'. This concept have been originally used by Jacob L. Moreno (1960) in sociometric studies to express popularity in groups, creating the basis for the modern structural and nuanced approach called Social Network Analysis.

Central actors are the most visible ones (Wasserman & Faust, 1994) and centrality indicates the level of actors' involvement in direct or mediated ties inside the network. When measuring centrality we describe the efficiency of an actor in the social network by counting both direct and mediated ties (Kenis & Knoke, 2002; Knoke &Yang, 2008). Therefore we suggest a more nuanced approach to assess the relation between nonverbal sensitivity and popularity.

SNA has been previously used to evaluate the interaction among students in educational institutions. Researches on secondary school (four to seven grades)

proved that pupils with similar academic competence or similar levels of aggression are closer in their networks, having more interactions and developing sub-groups (Xie, Cairns & Cairns, 1999). At least for children and adolescents, the findings support the idea of a significant relationship between academic achievements and group centrality with high achievers and low achievers occupying different social spaces. While high achievers gain status by the grade the get, low achievers would define different means to establish centrality (Flores-Gonzales, 2005). Similar studies on graduate adult students confirm the relation between social network centrality and academic success. Generally speaking college students' social network behavior has been positively associated with their academic grades (Steinfield, Ellison & Lampe, 2008; Hwang et al., 2007). For example, a research conducted on first year college students (Thomas, 2000) proved that students who were central in their networks mentioned also more university life satisfaction and willingness to continue studying in university. However, more specific analysis presented the importance of peculiar ties in achieving academic success. A research conducted on master's students (Cho, Gay, Davidson & Ingraffea, 2007) proves that centrality in friendship, communication, and adversarial ties had a positive impact on students' attitudes and grades. Other researches on graduate students (Pilbeam & Denyer, 2009; Secundo & Grippa, 2009) indicate that academic achievements were positively correlated to the level of external connectivity (outside university) and negatively correlated to the density of individual's friendship network. A panel study on five hundred second year university students (Trippet, 2005) proved that individual's structural positions in the network – using ties about 'participation in organizations' and 'knowing relevant others in university' – were not related to academic performances (cumulative GPA) but with similar satisfaction with university and courses.

Methodology

H1: We hypothesized that highly nonverbal sensitive individuals will be central in their networks especially in ties that involve support, empathy or tolerance. Being supportive, tolerant or less dogmatic and easy accepted have proved to be the main attributes of those having high nonverbal decoding skills. However, for other ties, as 'exchanging information' or 'looking for a professional advise', nonverbal accuracy could have no impact.

H2: We hypothesized t there is a positive relation between students' centrality in networks defined by 'exchange of information' or 'looking for professional advise' ties and their academic achievements and no significant relations between students' centrality in networks defined by 'emotional support' and their academic success. Being central in academic-related networks as 'exchange of information' could increase the expectations about the level of the grades and network

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centrality could be seen as a relevant predictor of the grade itself. On contrary, when a student is central in non-academic related ties, this could be seen as a non-significant predictor of his academic grades in the end of the semester.

The subjects were 72 first year college students from a Romanian private university, attending a course of Communication Theory and interacting on daily basis in five seminar groups of approximately 25 students each. The students were mostly females (86%) aged 19 to 22, with no previous participation in similar researches. Previous information about their peers' grades before university, have not been available to the participants. At the moment we conducted the research they were attending courses in their first university semester and no grades were available yet.

Measures

Nonverbal sensitivity testing. *A face and body form of Profile of Nonverbal Sensitivity (PONS) have been used, consists of 2 seconds slides of 20 silent face-only and 20 silent body-only items, presenting a 24 years of age woman enacting in 20 scenarios with different affective intensity as for example: 'expressing jealous anger' or 'ordering food in a restaurant'. The face and body PONS measures nonverbal sensitivity on visual channel only, having a .63 overall validity. The visual channel scores significantly correlate (râ.50, p< .001) with the full PONS (Rosenthal et al. 1979). A binary-choice scoring form is given to subjects asking them to choose the description they consider proper for each encoded situation.*

Network centrality. We obtained relational data using a sociometric questionnaire with a roster of names. We decided for a free-choice design, with no restrictions for the number of chosen actors, recommended in the literature when we assess centrality in ego-centered networks (Wasserman & Faust, 1994). Eight relational ties were analyzed: four connected with the educational environment – 'delegate someone to represent you on the academic level', 'cooperate with somebody in a project', 'looking for information about courses', 'looking for expertise in finding a job'; and four connected with outside college activities: 'take initiative in recreational actions', 'asking for financial support', 'looking for emotional support', 'like to share a positive event with'. Because subjects interacted on daily basis only with other 24 to 25 peers from their seminar group, separate rosters of names were given for all five seminars and students were asked to choose only peers from their group. For example if we wanted to assess the 'cooperation in a project' network we asked them 'With whom you would like to work together in a project to be presented in a student session in the faculty?' and the answers were dichotomous 'yes' or 'no' for each individual from the list. Similarly, if we wanted to assess the 'emotional support' network we asked them: 'To whom you would share personal information about a family issue?'

The data were analyzed using the Social Network Analysis software tool UCINET (Borgatti, Everett, & Freeman, 2002). The responses were used to generate adjacency matrices – with the names of each student on both line and column and student interactions (1 – present, 0 - no present) – for all five groups of students and each of eight relational ties. We calculated individual's centrality in each of the networks using degree centrality for the non-directional relational ties as for example 'cooperate with somebody in a project' and we add in-degree centrality as indicator of centrality in directional ones as 'looking for information about courses'. Popular actors are most of the time the 'object' and not the 'source' of the relation and in-degree and out-degree centrality indices are used in SNA to make such distinction. However, in case of directional ties, isolates, those who have no contribution to the analyzed network, are deleted.

In order to compare those centrality indices between different groups – in this case across the five groups involved in the research – normalized measured were calculated.

Academic achievements. We obtained student's grades in the end of the semester from the Communication Theory teachers who had assessed their performances only on this subject. Two separate teachers evaluated the students on a five points scale, from '1' - 'poor' to '5' – excellent. Additionally we had access to their cumulative performances, to all courses in the end of the semester, their Average Cumulative Grade (ACG).

Procedure

First the students had to complete the form of Face and Body PONS, during one Communication Theory class. The test was presented as a course task, relevant for their future career as communicators. Each student had to fill a code which was identical with the one from the list of roster names. In the end of the course, the teacher requested them to fill the sociometric questionnaire, giving them also the list of names and the attached codes in front. Students had to mark in the questionnaire the codes that correspond to the names from the list they would like to select for specific questions. They were advised to choose only students from their seminar group Additional attributes related to their gender, age and work experience were also registered. Students' grades on Communication Theory were directly obtained from the evaluators and students' Average Cumulative Grade (ACG) in the end of the semester were also collected from the faculty, two months after the research was conducted.

Results

Scores on short face and body version of PONS were compared on female and male subjects and also separate on body-only and face-only items (Table 1). Meta-analysis of previous researches on nonverbal sensitivity (Hall, 1984) has proved that females were more accurate then males, at least on visual channel or mix channels decoding tasks (both visual and audio). Rosenthal and his collaborators (1979) reported a consisted effect on gender for PONS test in 80% of the testes samples, N = 2615. Similarly, females from our sample were more accurate then males (t = 2.851, p<.01), and this relation is strongly significant in case of body-only items (t = 2.679, p<.01) and non-significant in case of face-only items. We compare the scores obtained by students from our sample with the normative group. The mean of nonverbal sensitivity scores for our first year college students is similar with Rosenthal standardized group of 68 married people: face (M â 15.51, SD = 1.66); body (M = 14.46, SD = 1.53), total (M = 29.97, SD = 2.35). Only in case of face-only items our subjects, especially males, scored lower. The analysis of variance (ANOVA) yielded significant effect for gender group (F = 8.131, df = 1, p< .006) in case of total PONS accuracy and body-only accuracy (F = 7.176, df = 1, p< .01).

Table 1. Means and standard deviation for nonverbal decoding accuracy scores

Level of nonverbal sensitivity	Total PONS score		Body-only items		Face-only items	
	M	SD	M	SD	M	SD
Females (N=62)	29.0	2.7	14.9	1.6	14.1	1.9
Males (N=10)	26.4	2.4	13.4	1.4	13.0	2.2
Total (N=72)	28.6	2.8	14.6	1.7	13.9	1.9

Although Rosenthal et al. (1979) reported positive correlations between the results of vocabulary testing exams and the PONS scores, in case of children, we did not find any significant relation between academic grades on both Communication Theory course and the Average Cumulative Grade in the end of the semester and nonverbal sensitivity scores (measured by face and body PONS). We have to add here that students' grades on Communication Theory were positively correlated with the Average Cumulative Grade obtained in the end of the semester (r (56) = .354, p = <.01) proving that grades could be reliable indicators for the academic achievements and academic success in general.

Student's academic achievements did not correlate with their ability to decode nonverbal cues on visual channel. The relation between the two variables seems rather negative, r (72) = –.232, p = .06 for body-only accuracy and academic grades on Communication Theory course and non significant in case of Average Cumulative Grade offering support for other findings of Rosenthal et al. (1979) about the modest correlation between PONS test results and subjects' general

intellectual abilities.. Their researches on individuals' differences in nonverbal sensitivity found weak correlations between PONS and academic achievements in case of children and no correlation with subjects' cognitive complexity in general or their IQ. The ability to decode body-only items does not correlate with their ability to decode face-only items, in our sample. Our data indicate that the accuracy in decoding emotional information from each of the two channels: body and face are rather different competencies and similar ideas could also be found also in the literature (DePaulo & Rosenthal, 1979). Subjects' pattern to assess information could be different in body-only items compare to face-only items. Taking this into account we subsequently present the results in relation to non-verbal decoding accuracy on all there aspects: 'face-only', 'body-only' and 'total PONS'.

To test the first hypothesis, we compute degree centrality for the non-directional ties and in-degree centrality indices for the directional ties, as measures for each subject centrality inside his seminar group and across all eight relational ties. As we predict there are significant correlations between nonverbal sensitivity measures and prominence in the networks, only for outside college activities relational ties and no significant relation between subjects' popularity and prestige in the networks defined as 'academic-related' and their nonverbal accuracy scores (*Table 2*).

Table 2. Correlations between nonverbal sensitivity and prominence in non-academic related ties

	initiative in recreational actions (N=59)	financial support (N=60)	emotional support (N=65)	share a positive event (N=56)
Total PONS[a]	−.154	.263*	.009	.009
Body-only[b]	−.258*	.112	−.032	−.090
Face-only[c]	−.003	.290*	.042	.015

*p < .05 two-tailed

[a] score for nonverbal accuracy measured with *Face and Body PONS*

[b] score for nonverbal accuracy in decoding body-only items, selected from *Face and Body PONS*

[c] score for nonverbal accuracy in decoding face-only items, selected from *Face and Body PONS*

In fact, among the four 'non-academic' relational ties: 'take initiative in re-creational actions', 'asking for financial support', 'looking for emotional support', 'like to share a positive event with', the scores of nonverbal accuracy modestly

correlated with the individual centrality only in case of 'financial support' and 'initiative in recreational actions'. Subjects who were more involved in actions of financial support in their network, either because they choose many others to interact with or they were chosen for such interactions are those who have higher PONS scores particularly in case of face-only items, r (60) = .290, p < .05. The data argue about the idea that nonverbal sensitivity students are central in their network in case of 'financial support' relation ties. In case of 'initiative in recreational actions' ('Whose proposal of a funny trip you would follow?'), the nonverbal accuracy is negatively correlated with individuals' centrality, r (59) = -.258, p < .05. In this case we measure prominence in the network by out-degree centrality – that counts for all the relations in which an actor chooses other to interact with. The obtained negative correlation could be interpreted as a less willingness to involve in out-side school recreational ties of those with high nonverbal sensitivity, especially on body items. However, the negative relation between nonverbal sensitivity and centrality in case of recreational actions outside the faculty could be due to gender differences in ability to decode body items. We have already showed that female from our sample were significant more accurate than males in decoding body-only items. And indeed, when we control for gender, the relation between nonverbal sensitivity and centrality in the recreational ties remains non-significant. This happens also because females proved to be more reluctant than males in choosing colleagues from the network to spend time outside university: the mean out-degree for females was significant lower than for male subjects, in this case (t = –1.933, df = 57, p < .05).

In order to test the second hypothesis we correlated the centrality indices that have been already mentioned with student grades (Communication Theory grades and Average Cumulative Grade in the end of the semester), for all eight relational ties. We test for gender effect on grades and we find no significant difference between female students' grades and male students' grades, in our sample. The data support our predictions, since students' grades did not correlate with non-academic relational ties centrality indicators, but significantly correlate with centrality measures on three out of four educational-related ties: 'delegate someone to represent you on the academic level', 'looking for information about courses', 'looking for expertise in finding a job' (*Table 3*). The data show a positive relation between someone's academic grades, both in case of *Communication Theory Course* and *Average Cumulative Grade*, and the level of centrality in undertaking formal leadership positions (r (53) = .398, p < .01; r (58) = .418, p < .01) and also between grades and the prominence of an individual as an information source, (r (38) = .540, p < .01; r (42) = .470, p < .01) Similarly, the higher the grades someone has for the particular communication course of in the end of the semester, the more he is considered 'a good adviser' in finding a job, (r (35) = .466, p<.01; r (38) = .409, p<.05). Being central in the 'cooperation' network, defined as student efficiency in cooperation for faculty projects is also positively correlated with the Average Cumulative Grade in the end of the semester

$(r\,(35) = .466,\, p<.01)$, although for the particular course of Communication Theory the correlation is week (see *Table 3*).

Table 3.Correlation matrix: student achievements and prominence in academic related ties

	Delegate someone to represent you	Cooperate in a project	Information about courses	Expertise to find a job	Course grade	Average Cumulative Grade
Delegate someone to represent you	—					
Cooperate in a project	.378**	—				
Information about courses	.811**	.429**	—			
Expertise to find a job	.537**	.179	572**	—		
Course grade[a]	.398**	.161	.540**	.446**	—	
Average Cumulative Grade[b]	.418**	.466**	.470**	409*	.354**	—

**p < .01 two-tailed, *p < .05 two-tailed

[a] Communication Theory Grades (5 points scale, '1' – 'poor'; '5' – 'excellent')

[b] The cumulative performances in the end of the semester (10 points scale)

We proceed for a hierarchical regression in order to find which of the relational factors above mentioned could have a significant impact in predicting the grades. Being central in the 'information network' was the only variable accounted for significant variance in Communication Theory grades ($R^2 = .265$), more than if we take into account the variance of means (F Change = 9.356, p < .01). When increasing the level of centrality in the 'information based' network we will automatically get a significant increase in the student grade for this particular course (= = .514, p < .01). Similarly, being central in the 'information network' was a significant predictor for the variance of the student cumulative performances in the end of the semester ($R^2 = .233$, F Change = 8.814, p < .01). Being central in the information network in sense that others expect from you information about courses and they are considering you a reliable source to offer such information would probably force the student to meet the expectations, increasing his chances to get higher grades in the end of the semester (= = .483, p < .01).

Discussion

We found that nonverbal accuracy in decoding nonverbal cues on visual channel was not correlated with students' grades. These results are non consistent with similar researches on children but could be discussed in the context of the specificity of college education. While learning is mainly a social interaction process in primary and even secondary education, and students have to learn 'to read' others feed-back cues – teachers and colleagues – in order to make the proper acquisitions, tertiary education is based more on personal intellectual abilities and relevant subjects' information and therefore nonverbal sensitivity could be irrelevant in such context. However we used only visual channel items to measure nonverbal accuracy and future researches should also include other measurements of nonverbal sensitivity that take also the audio and mix channels into consideration.

We also conclude that nonverbal sensitivity correlates with individuals' pro-minence in the non-academic relational ties and not with their popularity in the academic-related ones. Our data support such hypothesis, especially in case of 'asking for financial support' network. Thus, highly nonverbal sensitive students were more involved in support relations both as recipients and sources. It might be that nonverbal sensitive individuals are perceived as being more trustworthy or emphatic, and several mentioned researches proved they actually are more to-lerant, conflict avoiding and relation oriented people. The negative correlation we found between centrality in 'take initiative in recreational actions' and nonverbal sensitivity was due to gender differences in PONS scores. Females proved higher nonverbal accuracy than males (especially on body channel) and were also more reluctant in being involved in outside school recreational ties with peers from their student group. It seems that females are more selective in choosing collea-gues to interact with outside university. This behavioral pattern could be accom-panied by selective ways to access information in case of nonverbal sensitivity tasks. DePaulo & Rosenthal (1979) suggested a structure of nonverbal decoding skills that includes different ways to treat information relative to the channel involved. If indeed females are in general more selective than males when inte-racting with others, they could pay attention to other relevant cues compare to males, in a nonverbal decoding task.

Finally, our findings suggest the fact that 'academic related' networks, as 'looking for information about courses' or 'find a competent advise about how to get a job' are mainly centralized around those with higher academic grades. Academic achievement success is correlated with individuals' centrality in the education-related networks. Students who are trusted as formal leaders to re-present the group on faculty level and are more efficient in 'cooperating in faculty project' networks manage in the end to get the higher grades. The fact that grades were not correlated with centrality indices in non-academic related networks

proved that the relation between prominence in group and academic achievement should be different interpreted, taking into account the specificity of the relational tie, in this case academic or non-academic related.

Finally, among the four academic-related networks took into consideration in the analysis, only one variable: 'being central and enjoy prestige in the information network' significantly predict the variation of grades. When a student had more direct and indirect ties in the information network or especially when he was the object of those ties, meaning he was credited by others as an 'information source', he had also higher chances to receive a better grade in the end of the semester. One might think that our data show that individuals are able to correctly identify those who previously got higher grades and name them 'information reliable sources'. If that was the case, then the level of academic achievement would have become an independent factor explaining the individual centrality in the information network. However, we choose freshmen students who are in their first college semester, so they did not have anticipations about fellow colleagues' grades. Instead they could have just assess each actor informational potential based on daily interactions and their assessments proved to be valid when compare with the grades obtained in the end of the semester.

The strong correlations between grades and relational indicators and also the fact that independent teachers have evaluated our subjects' performances without knowing the purposes of present research, increase the validity of our measurements.

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