

# Connecting for success: Egocentric network types among underrepresented minority students at college

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## ARTICLE INFO

### Keywords:

Egocentric network  
Mobility patterns  
Social capital  
Adjustment to college  
Social adjustment  
Minority students

## ABSTRACT

This study investigates the egocentric networks of underrepresented minority students. Adjustment to college for underrepresented minority students often means balancing between the origin (i.e., low-status family) and host (i.e., academic) environments, requiring students to develop different coping strategies. The analysis included 124 Roma university students. We employed the contact diary method and the EgoNet program for mapping students' egocentric networks. We explored classification among egocentric networks by cluster analysis based on the network proportion of the origin, fellow, and host groups. Three clusters were distinguished. The *Host-based* cluster proved to be the most advantageous, while the *Balancing* cluster appeared to be the most disadvantageous in terms of network resources, well-being, and trust. Partners' ethnicity and educational attainment showed a strong connection with cluster membership. Our results highlight that small fellow communities can successfully interconnect the origin and host groups in students' egocentric networks.

## 1. Introduction

Students belonging to groups that are underrepresented in higher education, i.e., young students of certain ethnic groups, disadvantaged or first-in-family university students, face unique obstacles in the course of adjustment to the academic community (Carter et al., 2013). Due to their different socialization from the majority and their typically lower educational preparedness, the norms of the academic environment are often unknown and strange to them (Perna and Titus, 2005; Cerna et al., 2009; Nguyen and Nguyen, 2020). On the one hand, underrepresented minority students try to adjust to their new academic environment, and on the other hand, their ties are weakened with their communities of origin since students cannot really share their academic experience and challenges with them (Soucy and Larose, 2000; Winkle-Wagner, 2009; Lehmann, 2014). However, while their strong ties to their communities of origin are weakening, their weak ties to the academic community are not strong enough to allow for successful adjustment. Underrepresented minority students often report feeling stuck between two cultures or two groups (Thayer, 2000; Lehmann, 2014). Overall, adjustment to college for these students also means upward social mobility. Enduring the consequent social vacuum is demanding from a mental health perspective as well. According to previous studies adaptation to the new

environment is often accompanied by isolation, depression, lowered self-esteem, decreased mental and psychological well-being, and diminishing physical health, which briefly means reduced subjective well-being (Pritchard et al., 2007; Williams and Mohammed, 2009; Larose and Boivin, 2010; Lee et al., 2014; Schmidt et al., 2014; Stebleton et al., 2014; Iacovino and James, 2016).

Balancing between the origin (i.e., low-status family) and the host (i.e., academic) environment creates tensions and leads to different coping strategies for successful adjustment (Brandes et al., 2008; Cachia and Maya Jariego, 2018; Naudet, 2018). However, what successful adjustment to college really means is a matter of debate in studies investigating underrepresented minority students: to what extent is it necessary to assume the identity of the majority society, and does this require the breaking away from the origin community as an inevitable consequence? (Tinto, 1993; Tierney, 2000; Naudet, 2018).

Adjustment to college is a process usually defined as an interaction between the student and the institution (Tinto, 1993; Astin, 1999) and involves several dimensions (e.g., academic, personal-emotional, and social adjustment) (Baker and Siryk, 1984). Social adjustment to college is generally defined as the extent of integration into the college environment, the establishment of a support system, and dealing with the relocation from home and the separation from significant persons (Baker

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and Siryk, 1984; Gerdes and Mallinckrodt, 1994; Yang, 2020). Several studies have investigated the social aspect of underrepresented minority students' adjustment to college from different angles, using the concepts of social adjustment (Baker and Siryk, 1984; Schwitzer et al., 1999), social integration (Tinto, 1993), social capital (Stanton-Salazar, 2010), and the sense of belonging approach (Hurtado and Carter, 1997; Strayhorn, 2012).

Social network analysis provides a common ground for these approaches, as it analyses students' real social environment by capturing their social ties (Grommo, 2014; Lukács J. and Dávid, 2019; Rios-Aguilar and Deil-Amen, 2012; Thomas, 2000; Berry, 2008). Social relations and the resources available through them play a decisive role in adjustment to college (Soucy and Larose, 2000; Nora, 2001; Antonio, 2004; Grommo, 2014; Jariego et al., 2018; Mishra, 2020). The kinds of ties students can rely on and the extent to which they can embed into the academic community strongly determine drop-out and the successful completion of semesters and years spent in higher education, as well as the psychological well-being of students (Hagerty et al., 1996; Hausmann et al., 2007; Strayhorn, 2012; O'Keeffe, 2013; Stebleton et al., 2014).

To summarize the research, the ideal personal network for underrepresented minority students is a heterophilic, multicultural bridging network including alters from both the origin and host environments (Antrop-González et al., 2003; Antonio, 2004; Cole, 2007; Locks et al., 2008; Nunez, 2009; Grommo, 2014; Mishra, 2020). This kind of network simultaneously ensures resources by bonding and bridging ties, and therefore provides the emotional stability and the structural resources required to adjust to the host environment.

Ties to the *academic community* are essential in adjustment to college, as this is the host milieu in the process (Strayhorn, 2008). Relations with the academic community are especially important in the case of minority students since, according to the results of several studies, their sense of belonging is lower compared to majority students (Ostrove and Long, 2007; Stebleton et al., 2014). For this reason, social network analysis highlights the role of interaction with peer students in adjustment to college in the case of underrepresented minority students by also emphasizing the importance of multicultural, heterogeneous ties. Beyond the ties with the peer majority students, studies also point out the importance of ties to academic lecturers, mentors, and tutors. As some kind of institutional agents, these alters may enrich students with important bridging resources also required for successful adjustment to college (Smith, 2007; Bereményi and Carrasco, 2017; Beattie and Thiele, 2016; Pusztai, 2019). It is important to note that while high-status individuals are bound to high-prestige alters by both their strong and weak ties, low-status individuals may enrich their bridging social capital by using almost exclusively their weak ties (Lin and Dumin, 1986; Stanton-Salazar, 2001; Ream and Stanton-Salazar, 2007). Consequently, bridging resources and information required for mobility can be obtained by underrepresented minority students only through the weak ties with individuals of a different social status. The heterogeneous, multicultural network also makes it possible for the individual to preserve their complex identity while fulfilling a variety of expectations (Antrop-González et al., 2003).

The majority of current studies argue that breaking away from the *origin community* is not required for successful adjustment to college; what is more, preserving strong, supportive ties with the origin community and family has a key role in this process (Nora, 2001; Zhou, 2005; Rios-Aguilar and Deil-Amen, 2012). The individual gathers their bonding resources directly from the strong ties, i.e., the individual can experience intimacy and trust through these ties, and these provide support in harsh life situations (Kawachi, 2006). However, some researchers warn that the predominance of bonding ties may limit the formation of an individual's weak ties. From this aspect, social capital can be adverse since the network is closed, and the norms present in the origin community which are different from those of the majority society may hinder the individual's success (Coleman, 1988; Portes, 1998).

In balancing between the origin and the host groups, *small academic communities* may provide stability for students falling into a social vacuum (Coleman, 1988; Tinto, 1998; Cerna et al., 2009; Nguyen and Nguyen, 2020). Communities with students of similar origin and circumstances create opportunities for students to experience their ethnic identity and while also providing them with a possibility to connect to the university as a community with a special subculture instead of internalizing the norms and values of the majority (Hurtado and Carter, 1997; Antrop-González et al., 2003).

Even though in general students who have a brokerage network are more likely to stay at university, underrepresented minority students' egocentric networks tend to be closure networks (Thomas, 2000).

In this study, we examine the social dimension of adjustment to college by employing social network analysis. By capturing students' real ties, we would like to gain a deeper understanding of the network strategies involved in balancing between the origin and the host environment. We investigate this topic in a sample of underrepresented Roma university students in Hungary. The Institute of Mental Health's research group at Semmelweis University examined the students at the Roma Colleges for Advanced Studies Network<sup>1</sup> (RCASN), which aims to support Roma university students in obtaining their degrees. In this study, we explore what types of egocentric networks can be identified among Roma students, and what kinds of resources they provide. We also examine whether these network types differ by sociodemographic characteristics, and by the indicators of self-esteem, life satisfaction, subjective state of health, and trust.

The case of Roma university students is special for many reasons. The Roma population is not only the most populous but also the most disadvantaged minority group in Central and Eastern Europe. According to the estimates of the European Commission, about 10–12 million Roma live in the territory of the European Union (European Commission, 2019). In 2017, the proportion of 15–24-year-old Roma students attending higher education institutions was only 0.8% compared to 19.3% of non-Roma students of the same age group in Hungary (Bernát, 2018). In summary, the situation of Roma university students is intersected by their ethnicity, by their generally low social status, and by the discrimination of the majority society (Kende, 2007; Kertesi and Kézdi, 2011; Messing, 2017; Lauritzen and Nodeland, 2018).

We have to note that RCASN students represent a special sample. First, RCASN students are members of a college network which represents certain values, including Roma culture. Secondly, RCASN communities could play key roles in adjusting minority students to college by interconnecting the origin and the host milieu and providing many kinds of resources. Roma university students living with their families or living in a university dormitory may have different network types. Therefore, the generalizability of the findings is limited.

## 2. Methods

Our study examines the students of RCASN.<sup>2</sup> Due to our cooperation agreement with RCASN, we had the opportunity to include every RCASN student in the study, but participation in the research was voluntary. During the data-collection period between 2012 and 2015, RCASN had 151 Roma students in five colleges for advanced studies. Data from a total of 124 Roma students at colleges for advanced studies were collected, which means that our sample covered 82% of this population.

A slight majority of the students included in the sample are female (53%); most of them were between 19 and 24 years of age at the time of

<sup>1</sup> Colleges for advanced studies are dedicated to supporting talented university students in their studies and academic work. These colleges provide several special courses and offer accommodation in dormitories; moreover, students can obtain scholarships as well (Biczó, 2021).

<sup>2</sup> The population of RCASN consists of students from different years at different universities and varies from semester to semester (Biczó, 2021).

the data collection. At the time of data collection, 40% of the Roma undergraduates were freshmen, 36% were in their second year, and there were 10%, 6%, and 8% in their third-year, fourth-year, and fifth-year, respectively. Regarding the students' parents, more than half (52%) have an educational level of 8 elementary school years or less, 22% finished vocational school, 17% finished secondary school, and only 9% (a total of 16 persons) have a college or university degree. 86% of Roma students are first-in-family university students, which means their parents do not have a diploma. (For detailed demographical data, see Appendix A.)

Students' egocentric networks were explored by using contact diaries (Fu, 2005; Dávid et al., 2016) and the EgoNet software (Egocentric Network Study Software, McCarty, 2007). We employed questionnaires on values and mental health, as well (European Values Study, 2008; Rosenberg Self-esteem Scale, Rosenberg, 1979; Sallay et al., 2014). Data collection was implemented in the first semester of entering RCASN. Students completed the contact diary and questionnaires at the same time during a regular academic week.

### 2.1. Egocentric network measure: the contact diary

Students registered their interactions in the contact diary for one week. Contacts that needed to be recorded were thoroughly defined and included all except those that did not go beyond a greeting. They noted with whom, where, and in what form (face-to-face, mobile phone, online: chat/ VoIP) they communicated for each day of the given week. Immediately after, we collected data about the sociodemographic characteristics of the alters (gender, age, ethnicity, educational level, job, and place of residence) and the characteristics of the tie (the nature of the tie, how long have they known each other, how often they speak with each other, the extent to which they discussed important and personal things, and how much the student likes or dislikes the alter) in an alter name-interpretator table. Upon completing the contact diary, we provided an opportunity for the students to complement the list of the alters recorded in the contact diary, i.e., people with whom the students did not have any interaction during that week but played an important role in their lives could also be included in the network. In this way, we minimized the chance of leaving out an important but less active segment of one's egocentric network: only 44 students extended the list of alters, adding, on average, 3.5 alters (min = 1, max = 11, SD = 2.671).

The substantial merit of the contact diary is that it draws an egocentric network on the basis of real interactions and captures not only strong but also weak ties (Fu, 2005; Dávid et al., 2016). By applying this measurement tool, the size and composition of the network and the strength of its ties became exploratory.

After collecting contact diaries and name-interpretators, alter names were imported to EgoNet in order to explore the structures of the networks. We measured alter-alter relationships with the question "Does Alter 1 know Alter 2 in person?" (Yes/No). EgoNet interviews took 20–60 min on average, depending on how many alters students provided in the contact diary. 42% of the students (52) participated in this data collection phase. Data collection usually took one month, including the contact diary and EgoNet interview.

### 2.2. Conceptual framework

In a former analysis, we successfully applied the model describing migrants' mobility developed by Brandes et al. (2008) for the upward social mobility of Roma undergraduates (Lukács J. and Dávid, 2019). In their analysis, Brandes and colleagues used the dimensions of ethnicity/nationality and place of residence to capture origin, fellow, host, and other groups. Since Roma students' adjustment to college progresses from a low education environment to the academic community, besides the obvious ethnicity dimension, we considered the dimension of educational level as the most appropriate for the modeling of adjustment

to college (Fig. 1).

Ties with Roma persons with lower than secondary education attainment define the origin group; similarly, Roma alters with secondary or higher education define the fellow group, while the host group is represented by ties with non-Roma alters with secondary or higher education. Ties with non-Roma persons with lower than secondary education belong to the so-called other group. These four groups describe the social network model of upward social mobility.<sup>3</sup>

### 2.3. Measurement of network resources

In our study, we focus on the social aspect of adjustment to college by analyzing students' egocentric networks. Studies applying egocentric network analysis among underrepresented minority students usually examine network size, network composition, and network structure (Thomas, 2000; Rios-Aguilar and Deil-Amen, 2012; Biancani and McFarland, 2013; Grommo, 2014; Mishra, 2020). Besides these indicators, we also tried to detect the potentially available resources in these networks.

- Emotional resources: To capture the emotional resources, we applied a more refined, continuous indicator (Marsden and Campbell, 2012; Dávid et al., 2016). We relied on the dimensions of Granovetter (1973) in the conceptualization of the strength of tie, and from these, we used the emotional intensity and intimacy-mutual confiding dimensions related to emotional proximity for creating the index. To create the composed emotional resource index, we used principal component analysis with the following indicators: 1) in general, how much the responder likes or dislikes the given person, and 2) how important and 3) how personal the topics discussed between them are. Thus, the principal component preserves 76% of the heterogeneity of the original variables (see Appendix B). The obtained index is a standardized, continuous variable; the higher its value, the stronger the given tie should be considered. In our sample (in the case of 2315 alters), the index of the weakest tie is -2.7, and the strongest tie has a value of + 1.5.
- Structural resources: We also applied the approach provided by the position generators (Lin and Dumin, 1986) in an indirect way, and accordingly, alters above 18 years of age were classified into four groups based on their occupation. Besides students, the following groups were considered: inactive persons from a labor market perspective (unemployed, pensioner, disability retiree, homemaker), low status blue-collar alters in jobs not requiring professional

Alter's characteristics	Roma	Non-Roma
Lower than secondary education	Origin	Other
Secondary or higher education	Fellow	Host

Fig. 1. The model of Brandes et al. (2008) adapted to the upward social mobility of Roma undergraduates (Lukács J. and Dávid, 2019:70).

<sup>3</sup> The naming of these groups comes from the adaptation of Brandes et al.'s model (2008) (Lukács J. and Dávid, 2019), and does not by any means include normativity.

qualifications, and high status white-collar alters in occupations requiring higher qualifications and college or university degrees.

- We defined the number of institutional agents by aggregating former and current teachers, mentors, and tutors in the students’ network.

It is important to note that the existence of these kinds of ties does not indicate the availability of these resources.

#### 2.4. Measurement of self-esteem, life satisfaction, subjective state of health, and trust

We also aimed to collect data about students’ psychological and physical well-being, as research shows that adjustment to college for underrepresented minority students is often demanding from a mental health aspect (Pritchard et al., 2007; Williams and Mohammed, 2009; Larose and Boivin, 2010; Lee et al., 2014; Schmidt et al., 2014; Stebleton et al., 2014; Iacovino and James, 2016). Trust is also an important factor in adjustment to college (Boeck, 2022). We hypothesized that network types will differ by students’ well-being and trust. The following variables were used:

- self-esteem (RSES-H 10–40, Rosenberg, 1979; Sallay et al., 2014, Cronbach  $\alpha = 0.993$ );
- life satisfaction (EVS, 2008): All things considered, how satisfied are you with your life as a whole these days? 1–10;
- subjective state of health (EVS, 2008): All in all, how would you describe your state of health these days? 1–5);
- trust (EVS, 2008): Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people? The proportion of those giving the ‘most people can be trusted’ answer.

We have to note that based on our research design we can not prove whether social network characteristics cause lower levels of self-esteem, life satisfaction, subjective state of health, and trust, or whether students’ social network characteristics are affected by students’ actual physical and mental condition during the week of data-collection.

#### 2.5. Statistical methods

Descriptive statistics were used to describe the study sample. We employed K-means cluster analysis with IBM SPSS 21 software for cluster analysis, which distinguished three groups along the standardized ratios of origin, fellow, and host groups in the networks. Cluster centers did not move following seven iterations, and the F values of the ANOVA test were also high (see Appendix C). Based on validity criteria during cluster creation, only the network data of the 124 Roma university students were used for which every cluster forming variable had a valid value (exclude cases pairwise command). Cluster centers did not change significantly with different serialization of cases. We verified this with a two-sample t-test (see Appendix D). We also investigated the differences between the individual groups along the cluster forming variable with the Bonferroni Post Hoc test. We calculated Pearson’s chi-square test (with phi/Cramer’s V effect size) and ANOVA test (with  $\eta^2$  effect size) to examine associations between cluster membership and sociodemographical variables, self-esteem, life satisfaction, subjective state of health, and trust. For all tests, the significance level was set to 5%. IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, N.Y., USA) was used for statistical analysis.

Analysis of the egocentric networks was carried out using the EgoNet software (McCarty, 2007). EgoNet provided information about components and cliques in the networks and the degree, closeness, and betweenness of the alters. The density of the networks was calculated by UCINET software (Borgatti et al., 2002). The clusters of the egocentric networks were drawn with EgoNet2GraphML and Visone (Brandes and Wagner, 2004) software by emphasizing their structural characteristics.

Clusters were described by the following attributes: 1) number of alters in the main groups (class size: number of alters in class); 2) how well alters in the various groups are connected to each other (intra-class tie-weight: number of intra-class ties divided by class size); and 3) how well alters in one group are connected to alters in another group (inter-class tie weight: the number of inter-class ties divided by the geometric mean of class sizes) (Brandes and Wagner, 2004).

### 3. Results

In this section, we present the descriptive characteristics of egocentric networks followed by the main network types among Roma students. Finally, we describe the sociodemographic characteristics and cluster membership.

#### 3.1. Descriptive characteristics of egocentric networks

The mean network size of the 124 Roma undergraduates participating in the study was 26 alters (min = 5, max = 74 persons, SD = 11.976). During the week studied, a mean total of 65 interactions were conducted (min = 0, max = 154, SD = 26.778). Women had larger networks (28 vs. 23.4,  $F = 4.698$ ,  $p = 0.032$ ,  $\eta^2 = 0.037$ ) and more interactions compared to men (71.7 vs. 58.6,  $F = 6.509$ ,  $p = 0.012$ ,  $\eta^2 = 0.061$ ).

A total of 2.370 alters were mentioned in the contact diaries, and another 185 were added by the students as significant alters with whom they did not interact during the examined week ( $N = 2.555$ ). As the result of the adaptation of the model of Brandes et al. (2008), host (50%) and fellow (36%) alters are represented in the highest percentage in students’ networks (see Table 1).

#### 3.2. Network types

Based on the standardized ratios of origin, fellow, and host groups in the networks, three clusters were distinguished by K-means cluster analysis. Based on the Bonferroni Post Hoc test, from the aspect of the proportion of the origin alters, Cluster 1 and Cluster 3 showed significant differences from Cluster 2. With respect to the proportion of the fellow group, Cluster 1 was different from Cluster 2 and Cluster 3. With respect to the proportion of host alters, Cluster 3 showed a statistical difference from the other two clusters (Fig. 2).

Cluster 1 (Fig. 3.) includes a total of 35 networks. More than half of the networks in this cluster are dominated by the fellow group (55%), and one-third of the alters are hosts (33%) (see Appendix E). The proportion of origin alters is underrepresented in these networks. The proportion of RCASN college mates is the highest in the networks of this cluster (46% vs. 30%,  $F = 17.859$ ,  $p < 0.001$ ,  $\eta^2 = 0.154$ ), and the proportions of university group mates and teachers are the lowest (12.5% vs. 19%,  $F = 5.127$ ,  $p = 0.026$ ,  $\eta^2 = 0.050$ ). Compared to the other two clusters, the size of these networks is the smallest; they consist of a mean of 22 alters ( $F = 4619$ ,  $p = 0.034$ ,  $\eta^2 = 0.045$ ). When the density within the groups is investigated, it can be clearly seen that the most ties are found within the fellow group (mean intra-class tie-weight = 3.27), and this presumes a strong belonging to the RCASN community. While there is a strong tie between the host and fellow groups (inter-

**Table 1**  
Proportion of origin, fellow, host, and other ties in Roma undergraduates’ egocentric network.

	Alter	
	n	%
origin (Roma, lower than secondary education)	255	11
fellow (Roma, secondary or higher education)	831	35.8
host (non-Roma, secondary or higher education)	1163	50
other (non-Roma, lower than secondary education)	75	3.2

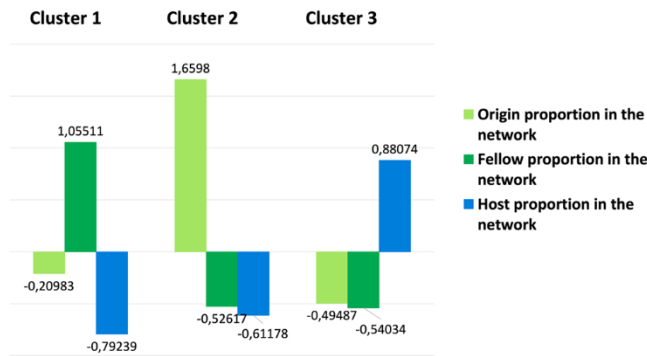


Fig. 2. Clusters based on the proportion of origin, fellow, and host alters. (n = 100, p < 0.001,  $\eta^2$  (origin) = 0.630,  $\eta^2$  (fellow) = 0.602,  $\eta^2$  (host) = 0.701).

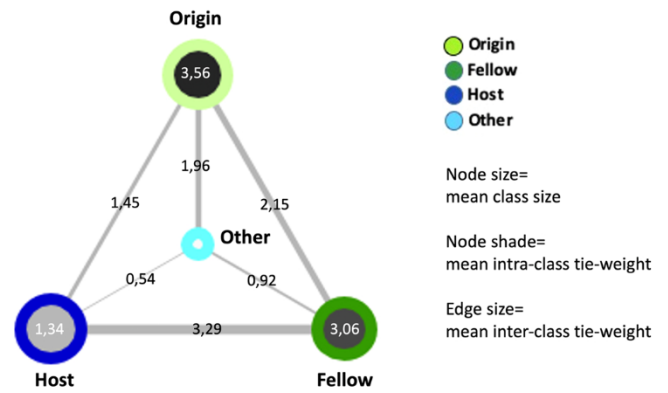


Fig. 4. Balancing cluster by the structural features of the main groups (Visone).

third of the alters comes from the host (36%) and the other third from the fellow (30%) groups (see Appendix E). The proportion of the kin ties is the highest in these networks (36% vs. 19%,  $F = 27.276$ ,  $p < 0.001$ ,  $\eta^2 = 0.218$ ), and at the same time the proportion of the RCASN college mates is the lowest (25% vs. 38%,  $F = 7.523$ ,  $p = 0.007$ ,  $\eta^2 = 0.071$ ). The networks of Cluster 2 consist of a mean of 24 alters, and medium-average-sized networks are more characteristic here compared to the other two clusters. The most ties can be measured with alters of the origin group (mean intra-class tie-weight = 3.56), which reflects a strong, stable, familiar support system. As for the ties between the separate groups, it can be observed that the fellow group plays a central role: both the host (mean inter-class tie-weight = 3.29) and the origin group (mean inter-class tie-weight = 2.15) are strongly connected to this group. The networks of this cluster consist of more components than those of the other clusters (2.8 vs. 1.6,  $F = 3.381$ ,  $p = 0.076$ ,  $\eta^2 = 0.098$ ). This means that in the networks of this cluster, the proportion of the three groups is balanced; however, ties between the separate groups are weak and loose, which may induce the disintegration of the network to separate components. In these types of networks, ego is balancing between the three approximately equally sized groups. Therefore, we labeled this cluster ‘Balancing.’ Regarding the Balancing cluster, the number of institutional agents is the lowest (1.3 vs. 2.9,  $F = 8.909$ ,  $p = 0.004$ ,  $\eta^2 = 0.038$ ) (See Table 2.). Possible structural resources made available by high-status alters in the networks of the Balancing cluster are the most difficult to reach, since low-status ties are over-represented (5.1 vs. 3.2,  $F = 4.653$ ,  $p = 0.034$ ,  $\eta^2 = 0.044$ ).

Cluster 3 (Fig. 5.) includes a total of 47 networks, which is the highest number of networks among all the clusters. These networks are dominated by the host group (63%). Fellow ties represent 29% of the alters, and the origin group is the most underrepresented in this cluster (see Appendix E), making up only 6% of the alters. The mean proportion of kin ties is also the lowest in these networks (16% vs. 27%,  $F = 19.467$ ,

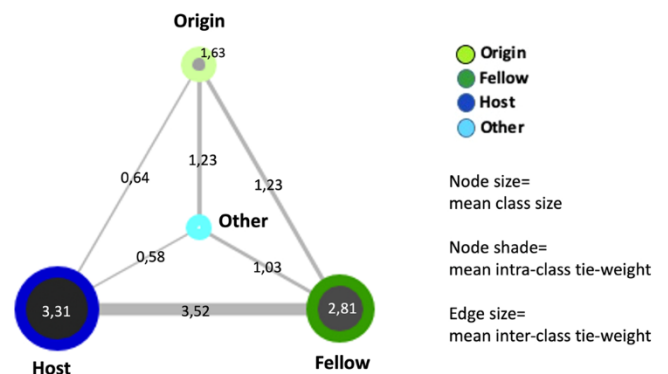


Fig. 5. Host-based cluster by the structural features of the main groups (Visone).

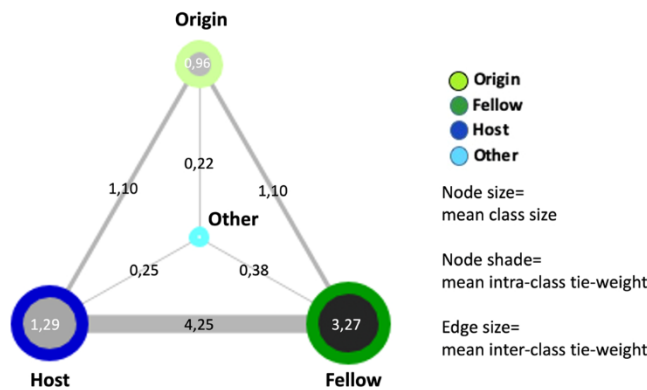


Fig. 3. Fellow-based cluster by the structural features of the main groups (Visone).

class tie-weight = 4.25), it can be observed that the origin group is a less integrated part of these networks, forming a separate clique. Cluster 1 is a small-sized, densely interconnected closure network that relies completely on the fellow group, i.e., the RCASN community. Based on these characteristics, we named this cluster ‘Fellow-based.’

Networks in the Fellow-based cluster represent a medium-level resource of possible structural resources (See Table 2.). The aggregate value of the emotional resource index is somewhat higher, but the difference is not significant.

Cluster 2 (Fig. 4.) includes 17 networks. The proportion of origin ties (29%) is the most predominant in these networks; approximately one-

Table 2  
Clusters by the possibly available resources.

Indicators	Fellow-based (n = 35)	Balancing (n = 17)	Host-based (n = 47)	p	$\eta^2$
Emotional resource index (aggregated)	0.109	0.026	-0.063	0.363	0.023
Structural resources 1. Number of white-collar alters	3.2	2.9	5.4	0.034	0.076
Structural resources 2. Number of blue-collar and inactive alters	3.6	5.1	2.9	0.074	0.057
Institutional agent Number of teachers, educators	1.7	1.1	2.9	0.009	0.079

$p < 0.001$ ,  $\eta^2 = 0.158$ ). In contrast, the proportion of university classmates, teachers and professors is the highest in these networks (21% vs. 13%,  $F = 9.5$ ,  $p = 0.002$ ,  $\eta^2 = 0.091$ ). The networks of the members of Cluster 3 are the most extended compared to the other two clusters; these networks consist of a mean of 29 persons ( $F = 6134$ ,  $p = 0.015$ ,  $\eta^2 = 0.059$ ). The host group is the most densely interwoven (mean intra-class tie-weight = 3.31), which suggests a stable university community in the background. Ties in the fellow group are also strong (mean intra-class tie-weight = 2.81), which may refer to the RCASN community. In a similar manner to the previous two clusters, the most ties can be measured between the host and fellow groups (mean inter-class tie-weight = 3.52); the origin and other groups are very loosely connected to the dominant groups. We named this cluster ‘*Host-based*,’ which refers to the extended brokerage network in which the host and the academic ties are overrepresented. The network of these students clearly suggests that they have become embedded into the academic community. Networks belonging to the *Host-based* cluster are the most abundant in possible structural resources (See Table 2.). The number of institutional agents (2.9 vs. 1.5,  $F = 6.911$ ,  $p = 0.011$ ,  $\eta^2 = 0.071$ ) and high status alters (5.5 vs. 3.1,  $F = 7.073$ ,  $p = 0.009$ ,  $\eta^2 = 0.075$ ) is significantly higher in these networks compared to the other two clusters. No statistically significant difference can be shown in the aggregate value of the emotional resource index of the *Host-based* cluster and that of the other two clusters.

### 3.3. Sociodemographic characteristics and cluster membership

The analysis did not show any difference between men and women regarding cluster membership ( $p = 0.868$ ). We did not find significant relations by age ( $p = 0.899$ ), nor by grade ( $p = 0.273$ ) or by type of studies ( $p = 0.908$ ). Although we analyzed not just freshmen vs. non-freshmen ( $p = 0.823$ ) but weighted our sample by grade ( $p = 0.273$ ), no statistical differences were found. Similarly, type of studies did not show any connection with cluster membership ( $p = 0.908$ ), nor did the distance from the hometown ( $M=98,9$  km,  $min=0$ ,  $max=486$ ,  $SD=84,059$ ) ( $p = 0.369$ ).

Parents’ level of education did not show any difference regarding cluster membership (fathers  $p = 0.201$ , mothers  $p = 0.509$ ) either. However, the proportion of the origin group is higher (13% vs. 4%,  $F = 10.136$ ,  $p = 0.002$ ,  $\eta^2 = 0.098$ ), while the proportion of the host group is lower (45% vs. 60%,  $F = 9.873$ ,  $p = 0.002$ ,  $\eta^2 = 0.096$ ) in those students’ networks who are first-in-family university students. Consequently, first-in-family university students have fewer white-collar alters (3.6 vs. 7.3.,  $F = 146.794$ ,  $p = 0.004$ ,  $\eta^2 = 0.095$ ) and fewer institutional agents (1.8 vs. 3.3,  $F = 25.846$ ,  $p = 0.05$ ,  $\eta^2 = 0.042$ ) in their networks. Parents’ ethnicity (i.e., both of them are Roma or not) was also not shown to be a significant factor regarding cluster membership ( $p = 0.895$ ).

The partner’s ethnicity and level of education (i.e., origin, fellow, host, other), however, showed a connection with cluster membership ( $\chi^2(4, N = 61) = 10.335$ ,  $p = 0.035$ ,  $V = 0.291$ ). Those students whose partner’s educational attainment is lower than secondary education (i.e., origin or other) are overrepresented in the Balancing cluster ( $\chi^2(1, N = 61) = 6.139$ ,  $p = 0.013$ ,  $\Phi = 0.317$ ). Students with host partners are overrepresented in the Host-based cluster ( $\chi^2(1, N = 61) = 4.560$ ,  $p = 0.033$ ,  $\Phi = 0.273$ ).

### 3.4. Cluster membership by self-esteem, life satisfaction, subjective state of health, and trust

Cluster membership does not show significant difference by the variables of self-esteem, life satisfaction, subjective state of health, and trust (see Table 3.). However, it should be emphasized that the students’ subjective state of health in the *Balancing* cluster scored significantly worse compared to students in the other two clusters (3.2 vs. 3.7,  $F = 4.358$ ,  $p = 0.040$ ,  $\eta^2 = 0.053$ ). Although it cannot be demonstrated by

**Table 3**

Clusters by self-esteem, life satisfaction, subjective state of health, and trust.

Indicators	Fellow-based (n = 35)	Balancing (n = 17)	Host-based (n = 47)	p	$\eta^2$
Self-esteem (RSESH, 10–40)	27,1	24,39	27,59	0241	0048
Life satisfaction (EVS, 1–10)	6,76	6,1	6,72	0513	0017
Subjective state of health (EVS, 1–5)	3,68	3,24	3,78	0108	0056
Trust (EVS, Proportion of those giving the ‘most people can be trusted’ answer)	24,1	15,4	19,4	0858	0004

statistical methods, students in this cluster attained worse results in self-esteem (24 vs. 27,  $p = 0.097$ ), life satisfaction (6.1 vs. 6.7,  $p = 0.247$ ), and trust (15.4% vs. 21.5%,  $p = 0.852$ ) compared to other students. Altogether, it suggests that the students’ subjective well-being and trust in the *Balancing* cluster is worse than that of the students in the other two clusters, although we have to note that this correspondence cannot be causally interpreted.

## 4. Discussion

Successful social adjustment to college is usually defined as successful integration into the college environment, the establishment of a support system, and dealing with the relocation away from home and the significant persons there (Baker and Siryk, 1984; Gerdes and Malinckrodt, 1994; Yang, 2020). One of the main issues regarding underrepresented minority students’ adjustment to college is defining to what extent it is necessary to integrate into the academic community, and whether this requires breaking away from the origin community as an unavoidable consequence (Tinto, 1993; Tierney, 2000; Naudet, 2018). In our study, we applied social network analysis to gain a deeper understanding of underrepresented minority students’ adjustment from a social aspect. By analyzing Roma university students’ egocentric networks, we explored the main groups that students can rely on in adjusting to college and the resources these ties can provide. We identified the three most characteristic network types among Roma university students by conducting cluster analysis based on the proportion of origin, fellow and host alters.

Of our three clusters, the *Host-based* cluster is the most extended and provides the most structural resources for students. Previous research showed that for upward social mobility, the host-dominated, extended brokerage network is the most ideal for underrepresented minority students (Antrop-González et al., 2003; Antonio, 2004; Locks et al., 2008; Nunez, 2009). Students with a host-dominated network who are able to preserve their origin ties possess both bridging and bonding types of resources (Rios-Aguilar and Deil-Amen, 2012).

As the *Fellow-based* cluster illustrates, small communities could have a key role in adjustment to college. This cluster is a small-sized closure network that is determined by the RCASN community. Due to the weak origin and host ties, students in this cluster can rely only on RCASN ties for possible emotional and structural resources. It can be assumed that the lack of this kind of small academic community would greatly jeopardize the successful adjustment of students without strong origin and host ties since they would lack most of their resources (Hurtado and Carter, 1997; Antrop-González et al., 2003; Nguyen and Nguyen, 2020). However, it is important to note that while these communities provide stability in the network of underrepresented minority students, at the same time, they also limit the enrichment of university ties (Hurtado and Carter, 1997). Small academic communities similar to RCASN colleges are able to stabilize the egocentric networks of students finding

themselves in a social vacuum (Coleman, 1988; Tinto, 1998; Cerna et al., 2009; Nyíró and Durst, 2018; Boros et al., 2021).

Networks in the *Balancing* cluster are the most balanced regarding the proportion of the origin, fellow, and host groups, although the cluster also demonstrates how challenging it is to integrate these groups into one egocentric network. Research suggests that by simultaneous connection to groups facilitates the formation of the complex identity of the individual, which suggests higher self-esteem and that individuals can experience multiple layers of identity (Thoits, 1983; Zou, 2009). However, conforming to the norms of different groups can be mentally demanding (Naudet, 2018). Our results imply that connecting to all of the three groups, or at least ties to the origin group supports the adjustment to college of underrepresented minority students by different resources; however, adjusting to origin, fellow, and host groups with the same intensity may incur severe mental costs. Here we have to note again that our results cannot be causally interpreted because of the research design.

Students' socio-demographical characteristics (sex, age, grade, parents' educational attainment, and ethnicity) did not explain cluster membership. However, partners' ethnicity and level of education showed a strong connection with students' network types. It is important to note that this cross-sectional analysis is not suitable for defining the direction of this correspondence: whether partners' social characteristics form students' networks or students' networks shape partner selection. Nevertheless, students' partners seem to have an important role in adjustment to college. In the case of upwardly mobile Roma – especially women –, one of the hidden costs of mobility is finding a proper partner who understands their motivations and background (Durst et al., 2014; Dés, 2021). We have to note that in first-in-family university students' network origin ties are overrepresented, while host ties are underrepresented. Consequently, these students miss the structural resources needed for successful adjustment to college. The results in this study strengthen former research findings, as low-status individuals may enrich their bridging social capital by using almost exclusively their weak ties (Lin and Dumin, 1986; Stanton-Salazar, 2001; Ream and Stanton-Salazar, 2007).

## 5. Conclusions

In this study, we employed social network analysis to gain a deeper understanding of the social aspect of adjustment to college. We explored the main egocentric network types among the special sample of RCASN students. The analysis demonstrated that there are multiple strategies for adjustment to college based on the proportion of origin, fellow, and host alters. Results indicate that in these strategies, partners' ethnicity and educational attainment have a decisive role, which also indicates the scope of future research. Our research is in line with research on Roma minority mobility trajectories which shows that higher-educated Roma create a bicultural Roma middle-class identity and have a foot in two different worlds (Durst and Bereményi, 2021). On the one hand, by simultaneously connecting to the origin and the host groups, individuals can experience multiple layers of identity (Zou, 2009). On the other hand, conforming to the norms of different groups can be mentally demanding (Naudet, 2018). This constant balancing is the cost of mobility from the social network perspective (Cole and Omari, 2003; Friedman, 2014; Durst and Bereményi, 2021). We must also emphasize the role of small fellow communities, which can mediate the egocentric networks of students, interconnecting the origin and the host environment. In light of the results, it can be stated that the perspectives provided by egocentric network analysis significantly contribute to the modeling and interpretation of the social aspect of adjustment to college. We consider these results the first wave of a kind of panel study among RCASN students. In the next wave, we would like to focus on the changes in network strategies after university life among RCASN ALUMNI.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.socnet.2022.09.002.

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