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Mixed Methods in Analysis of Aggressiveness and Attractiveness: Understanding PE Class Social Networks with Content Analysis

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Abstract: The aim of this study is to detect and analyze the relationship between verbal aggressiveness and interpersonal attractiveness using four secondary-school PE classes in central Greece (88 nodes). Content analysis of open-ended questions, social network analysis, Spearman test and PCA have been implemented. Main results: scientific and social attractiveness are interrelated with a subsequent emergence of power structures and negatively related to verbal aggressiveness. Targets of verbal aggressiveness receive aggressiveness consisting of hurt, irony, rudeness and threat. The general grade and students' tendency for distinction are positively related to attractiveness and negatively related to verbal aggressiveness. Types of targets of interpersonal attractiveness are proposed ("the untargeted powerful" and "the targeted powerful").

Keywords: attractiveness; aggressiveness; content analysis; social network analysis

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1. Introduction

1.1. Interpersonal Attractiveness

Interpersonal attractiveness is defined as a positive attitude or assessment of a person [1]. It consists of three dimensions: (a) task or scientific attractiveness, translated as desire for task/scientific collaboration, which represents the "task or respect dimension", meaning one's dependence on others' problem-solving abilities to see tasks accomplished (b) social attractiveness, desire to befriend others (socialization), and (c) physical attractiveness triggered by outer characteristics [2]. Attractiveness encourages communication [3], and subsequently, interpersonal attractiveness facilitates the interaction process among people [4]. Many studies have focused on the interpersonal factors that may lead to relationship development. Such factors are personality traits such as expressiveness, communication skills such as sense of humor, similarities in background or experiences, the frequency of interactions or the age and status compatibility [1,5–7]. Behavior and attitude similarity increase interpersonal attractiveness [8–10]. Based on the theory of complementary needs [11], the theory of self-expansion has been developed, stating that interpersonal attractiveness develops not only in the case of similarity but also in cases where people feel the need to improve themselves or complement their needs [12]. Interpersonal attractiveness has been studied in the educational context, stressing the role it can play in the emergence of positive climate and relationships in [13–15], pointing out that scientific and social attractiveness affect emotional learning, increasing levels of learning motivation and decreasing anxiety.

1.2. Verbal Aggressiveness

Infante and Rancer [16] mentioned two types of aggressive communication, with the aim of attack as their main distinguishing feature: argumentativeness, which means attacking one's set of beliefs in certain issues, and verbal aggressiveness, which means

attacking one's self-perception but not their opinions. Both are aggressive forms of communication, perceived as two distinct poles that represent the communication continuum from constructive to destructive communication. These two forms of communication usually co-exist in human behavior [17]. Many types of verbally aggressive communication have been identified: competence attacks, work ethic attacks, swearing, threats, character attacks, nonverbal behaviours, teasing, background attacks, and physical appearance attacks [18–21]. The principal conclusion of research on verbal aggressiveness is that it has negative, destructive and unconstructive effects [22]. Detrimental effects are mentioned for those experiencing verbal aggressiveness [23–25]. It and is negatively related to interpersonal attractiveness [15,26]. Studies have identified the ample use of verbal aggressiveness in educational contexts [27] mainly stating the negative effects it has on the self-confidence and the appearance of anxiety in [16,28–31] since desire for interaction with teachers and academic commitment are decreased. Furthermore, Bekiari and Petanidis [32] investigated the relationship between teachers' verbal aggressiveness, interpersonal attraction and students' intrinsic motivation in physical education context, suggesting distinct types of relations between students and instructors.

1.3. Aim of the Study

Social network analysis indicated a relationship between social network position, transformational leadership, and innovative climate in schools [33] while network relationships are facilitated by learning and trust in the school environment [34]. With regards to social network analysis, verbal aggressiveness and interpersonal attractiveness have been scarcely studied as holistic structures [9], that is as community characteristics shaped by the individual characteristics of each node participating in the community-network. The basic premise of social network analysis is that a community of people–nodes, for example, a classroom of students may be expressed as a network of relationships (relationships of power, information exchange or aggressiveness). Daly et al. [35] state that the educational and learning contexts have acquired more relational and structural perspectives and social network analysis when imposed may facilitate reforms that affect student performance. Bekiari and Hasanagas [22] studied verbal aggressiveness networks among physical education students presenting destructive communication effects while they suggested three forms of aggressiveness. Dynamic analysis of secondary education verbal aggressiveness social networks of students and teachers indicated the gradual increase in verbal aggressiveness through time [36,37].

From the qualitative perspective, Daly et al. [35] had participants provide verbally aggressive messages directed to them by their siblings, adopting a content analysis approach [38] used open semi-structured interviews to examine verbally aggressive communication between coaches and athletes. Interviews were also used by [17] to examine students' and teachers' perception about verbal aggressiveness and argumentativeness, while [39] used case study to examine interpersonal communication and verbal aggressiveness among footballers.

However, no studies have attempted to approach verbal aggressiveness and interpersonal attractiveness using qualitative methods in combination with quantitative methods of structural analysis such as network analysis. This study followed mixed methods. In the first part, network analysis and additional quantitative analysis was carried out to establish the students' profile regarding attractiveness and aggressiveness. In the second part, qualitative content analysis of the questionnaire's open-ended questions was carried out to understand in-depth students' perceptions regarding aggressiveness and attractiveness and clarify whether these perceptions converge or diverge with the structural and quantitative results.

In this study, mixed methods attribute new meaning to the structural side of relationships of attractiveness and aggressiveness, making PE student network interactions obtain further content and meaning and, in turn, helping us to get insights into the development of node relationships, "the day-to day variability of social relationships" [40]. With the

mixed methodological approach, the opportunity is given to fill the gap that exists in the literature in terms of structural and qualitative investigation of these characteristics which constitutes the innovation of the study from a sociological perspective. Therefore, the expected added value of the present research at academic level lies in the detection of functions of the structural behavioral phenomena, while at a practical level the understanding of causal relations of these behaviors is expected to be enhanced, offering knowledge to (PE) instructors who are able to realize the relationships developed in their classrooms and thus help them to handle group dynamics more efficiently.

2. Methodology of the Study

2.1. Analysis of Social Networks

Social network analysis provides a powerful model for social structure [41] that allows one to move from the concept of cognitive balance in individual minds to that of interpersonal balance in social groups [42]. A full analysis of social networks was applied to PE classes. The field of education has been selected other times [43] as a field of social network analysis, as it enables access to a complete network sample. In such a network, there are direct links between nodes, creating a fully connected network. Standardised ('closed type') questionnaires were used for both network and non-network variables. Network variables measured attractiveness (who is attractive to you?—physical attractiveness, who do you ask for help at school—task attractiveness, who is friendly to you?—social attractiveness), verbal aggressiveness (who hurt or insulted you?, who used ironic comments against you?, who is rude to you?, who threatens you?), argumentativeness (who agrees with you?, who disagrees with you?, who is weak during a discussion?) and social power (who do you advice for personal issues?, who do you advice for school issues, who is sympathetic to you?). In fact, the entire population of each PE class participated and formed a network of relationships, such as attractiveness [2], aggressiveness [16], trust and emotional dependence [44]. The analysis of social networks is based on algebraic indicators and is used to detect and quantify the hierarchies of relationships. Each network is captured as a polygon where the tops correspond to the respondents (members of the network) and the (existing) diagonals constitute the different relationships. Essentially, network analysis is an empirical operationalization of System Theory. According to the analysis, each node (member) of the network acquires its properties (being strong or weak) through the interactions it develops with other nodes. For example, one has power because others give it (if they trust him/her) and does not necessarily acquire it from non-network variables (for example, gender, general social and academic characteristics, etc.). These relationships shall be measured on the basis of tested socio-informatics software (Visone 1.1.), which is developed by the members of the Algoritmics Group of the Department of Computer and Information Science at the University of Konstanz, Germany. It is a free research tool and does not aim for any kind of commercialization. Their structural and social interpretation is described as follows:

(a) In- and Out-degree (occasional influence) concerns direct contact: the in-going means influence one receives from the other nodes and the influence that one creates towards the other nodes having out-going contact to them;
(b) Katz status (cumulative influence) means the influence exerted by a person through a successive process: the number and size of the chain-contacts leading from each node to the next one successively. Thereby, there is a deeper, long-chain relationship rather than an occasional one;
(c) Pagerank (distributional influence) is similar to Katz status but narrows the edges because it is based on the transferred value from one node to another: it counts the number of nodes that come into contact with each other and not the length of chain-relationships;
(d) Authority (special competitiveness or dominant position) shows the nodes that attracts the most links from the other nodes, among those that intensively seek to maintain relationships. In this case, it reveals a clear tendency to become a target. For example,

high authority in case of attractiveness characterizes a student who has attracted links from many other students who are intensively looking for attractive students. Their formulas are easily accessible on the web (https://visone.ethz.ch/wiki/images/6/67/VisoneTutorial-archeology.pdf, accessed on 25 June 2021). The above indicators are centrality analysis indicators. Centrality indicates the number of connections each node has in their network. Thus, it represents the individual characteristics of the nodes and consists of an expression of the social structures (relationships between the top and bottom nodes of the hierarchies). Centrality indicates the importance of each node in the network and the extent of potential change in the network in case of a particular node's withdrawal.

2.1.1. Participants

Network samples were taken from four PE classes of secondary schools in Trikala region. More specifically, the networks consisted of four classes in the academic year 2019–2020 (50 male and 38 female, therefore 88 students in total). A total of 83 out of the 88 students who were present during the questionnaire distribution filled out the questionnaire (network and non-network part). Of course, the network sample was not a random one, but this is not a weakness, as the purpose of the study was the analytic and not the descriptive statistics. All of the students in each class (network) knew each other well. Each student replied for any relationships developed with each one of the other students, in particular for the relationships of attractiveness, verbal aggressiveness, argumentativeness and power. Therefore, the questionnaires were branded in order for the participants to select the specific people they wanted and the nodes were thus identifiable. All of the participants were informed of the purpose and legality of the investigation, and it was also noted that the names would remain known only to the researcher.

2.1.2. Data Collection: Procedure

Prior to the collection of the data, ethical standards were formally met, with the legal permission to carry out the research by the Institute for Educational Policy (IEP). The researcher provided information to interviewees about the purpose of the investigation and everyone signed a consent form. It was clarified that their participation in the survey was voluntary, and that they were free to deny. They could interrupt the process whenever they wished. In addition, they were informed of the anonymity of their participation and the confidentiality of the research, assuring them that the data would only be used for scientific purposes within the university.

2.1.3. Research Tools

Using already tested network questionnaires as templates [15,22,26,30,44,45] standardised full network analysis questionnaires have been developed, which included network relationships of attractiveness (who is attractive to you?—physical attractiveness, who do you ask for help at school—task attractiveness, who is friendly to you?—social attractiveness), verbal aggressiveness (who hurt or insulted you?, who used ironic comments against you?, who is rude to you?, who threatens you?), argumentativeness (who agrees with you?, who disagrees with you?, who is weak during a discussion?), power (who do you advice for personal issues?, who do you advice for school issues, who is sympathetic to you?) and non-network variables that contained a variety of parameters of both personal and socio-economic nature, such as personal characteristics (age, gender, social class, etc.), spatial characteristics (place of birth, childhood, residence, etc.), education (studies, grades, etc.), family characteristics (parent education, educational level, economic situation), foreign travel, internet use, future goals, behavioural inspiration or lessons from classmates and teachers, interest in sport, etc.

2.1.4. Data Analysis

The data was analyzed with Visone 1.1 and SPSS 26.0. For network analysis, software (Visone 1.1) developed by the Department of Computer and Information Science at the University of Konstanz, Germany, visualization of the various structures (hierarchy pyramids) was attempted, highlighting who is first or last in them, that is who is at the top/bottom of hierarchies (for example, who is the most or least task/scientifically attractive or is the most/least eminent target of verbal aggressiveness). With SPSS 26.0 (IBM Corporation, Armonk, NY, USA) and after the regularity check was taken into account using Shapiro-Wilk and Kolmogorov-Smorinov, statistical tests were carried out, such as Spearman test ($p \leq 0.01$ (*) and $p \leq 0.05$ (**)) to identify correlations and factors that affected, strengthened or weakened one's position in each hierarchy (targeting verbal aggression, trust etc.). The Spearman test has been preferred to multivariate analysis because it enables an overview on all relations. Principal Component Analysis (PCA) has also been applied between network variables suggesting a typology. Numerous algorithms, such as in-degree (occasional hierarchy), Katz status (cumulative hierarchy), pagerank (distributional hierarchy), authority (dominant position) highlighted overt and latent, formal and informal targeting structures for attractiveness, verbal aggressiveness and hierarchies of trust or dependencies. These algorithms reflect whether each node brings together the actions of the other nodes. Practically, a node's great centrality means that the network, to a large extent, is dissolved upon its departure.

2.2. Analysis of Qualitative Approach

Open-ended questions assist the understanding of structures and their determinants, since they do not limit participants to a predetermined selection of standardized answers [46]. Open-ended questions seem to feature information not obtained through closed questions as answers to open-ended questions are usually statements [47]. Open-ended questions where the respondents answer in their own words may provide in-depth information [48] making the statistics-based comment more insightful [49] as participants choose terms of their own choice to describe and emphasize significant topics to them and orient to the research topic in their own way [50].

Understanding is the key in qualitative research because it refers to the conditions of knowledge and the outcome of the knowledge acquired [51,52]. It focuses on the meaning of individuals in specific contexts [53]. Qualitative data analysis is inductive by letting key categories and concepts emerge from the data [54]. Content analysis may also be based on the frequency with which particular categories of meaning are used [50]. Categories function as means of structuring the content, creating types and evaluating statements [55]. The sequence of steps in content analysis is the following: 1. selecting material, 2. creating a coding frame consisting of main categories and subcategories, 3. dividing material into units of coding, 4. trying out the coding frame through double-coding, followed by a discussion of units that were coded differently, 5. assessing the coding frame in terms of the consistency of coding and in terms of validity and revising it accordingly, 6. coding all of the material, using the revised version of the coding frame, 7. interpreting and presenting findings [55].

2.2.1. Qualitative Data Collection

The aforementioned sample (88 students of the PE school classes) answered the 4 open-ended questions included in the non-network part of the questionnaire: 1. "What characteristics should one have to be your friend?" 2. "How do you perceive verbal aggressiveness?" 3. "How do you perceive argumentativeness?" 4. "How do you perceive attractiveness?". The participants have defined these relationships according to their experiences and understanding, so that further connections to the quantitative results are presented and deeper insight is gained regarding these relationships with the network and quantitative results.

2.2.2. Data Analysis of Qualitative Data

Coding in the context of analysis means that section of the text is selected and linked to a category. Thus, a coded text segment consists of two elements: a text passage and an assigned category [56]. Content analysis of the open-ended questions was conducted by counting the frequencies of the mostly used keywords which allowed us to focus on the most important structures (Hseih and Shannon 2005). MAXQDA 2020 software by Verbi GmbH, Berlin, Germany, was used, allowing us to highlight text passages electronically and then go back through the data a second time to assign codes to the passages and create categories [55]. It also helped us to analyze the frequency of categories and create corresponding frequency tables [56].

3. Results

3.1. Social Network Analysis

The basic circle form along with several hierarchy structures (hierarchy of Katz status, pagerank and authority) of interpersonal attractiveness, social power and verbal aggressiveness are presented. Density differences are observable between networks. Figure 1, network of physical attractiveness (31.81%) and Figure 2, network of social attractiveness (37.01%) and Figure 3, network of scientific attractiveness (17.25%) are much denser than networks of social power (10.60%) in Figure 4 and verbal aggressiveness (1.73%) in Figure 5.

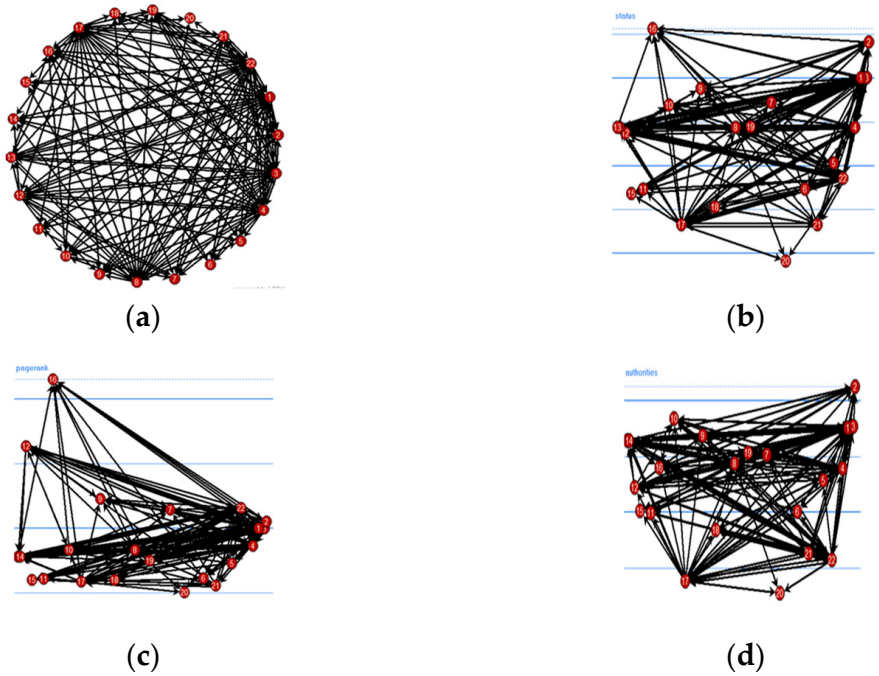

Figure 1. Network of physical attractiveness (attractive to others). Basic-circular form of network (**a**), hierarchy of Katz status (**b**), hierarchy of pagerank (**c**), hierarchy of authority (**d**).

Comparing networks of attractiveness in Figures 1–3, it is evident that relations are more intense regarding physical attractiveness (31.81%) and social attractiveness (37.01%) than scientific attractiveness (8.4%). This can be explained by the fact that students may consider more than one of their classmates as physically or socially attractive, but scientifically attractive students who can provide academic assistance are opted with stricter criteria. It seems that students distinguish between each other based on their scientific profile. The same could apply in a comparison among physical and social attractiveness networks and social power networks (10.60%). The power given to personal mentors is based on stricter criteria as well. There may be quite a few physically attractive and socially attractive classmates, but mentors on personal issues who concentrate others' trust and are advised on more intimate issues which are far and few between.

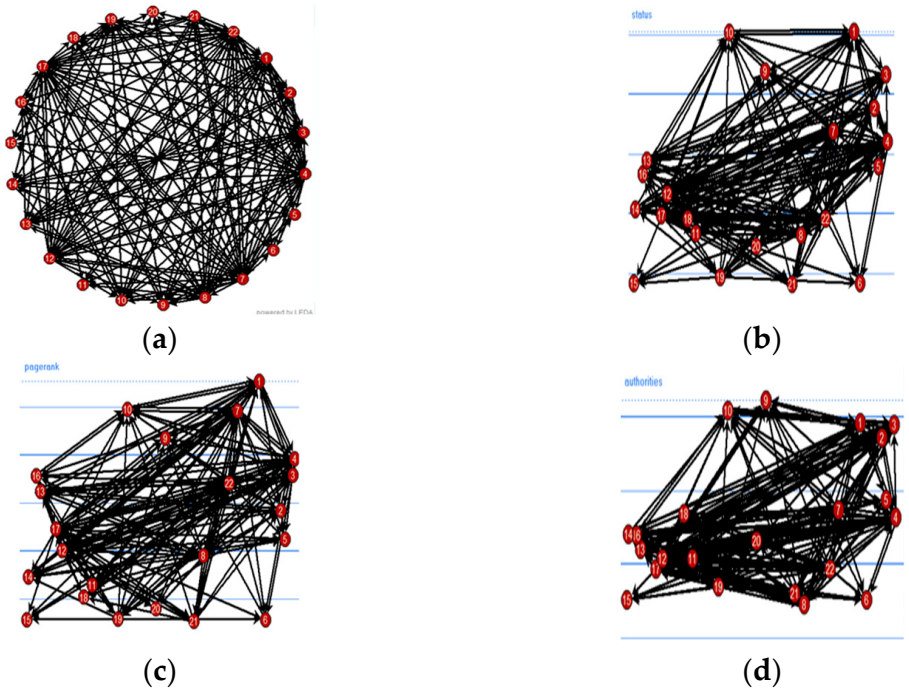

Figure 2. Network of social attraction (friendly with you). Basic-circular form of network (**a**), hierarchy of Katz status (**b**), hierarchy of pagerank (**c**), hierarchy of authority (**d**).

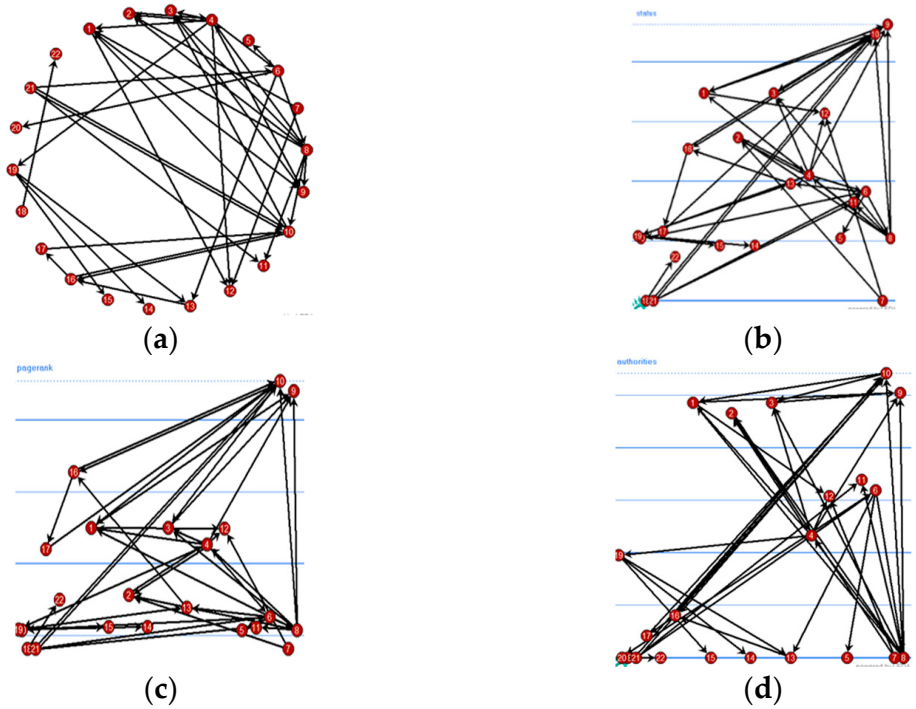

Figure 3. Network of Scientific attractiveness (Help homework_others). Basic-circular form of network (**a**), hierarchy of Katz status (**b**), hierarchy of pagerank (**c**), hierarchy of authority (**d**).

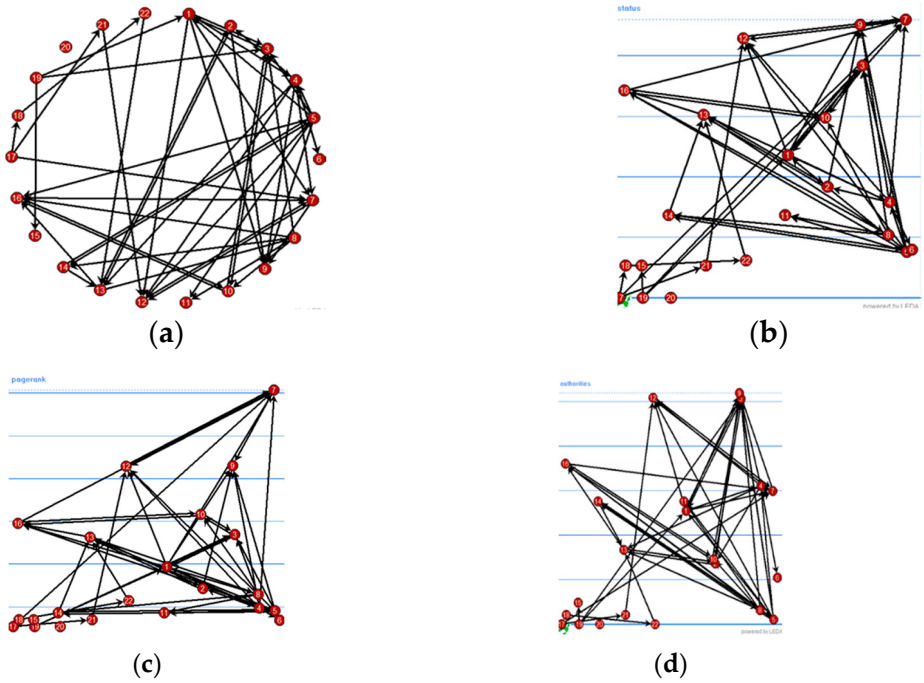

Figure 4. Network of social power (Advice on personal issues). Basic-circular form of network (**a**), hierarchy of Katz status (**b**), hierarchy of pagerank (**c**), hierarchy of authority (**d**).

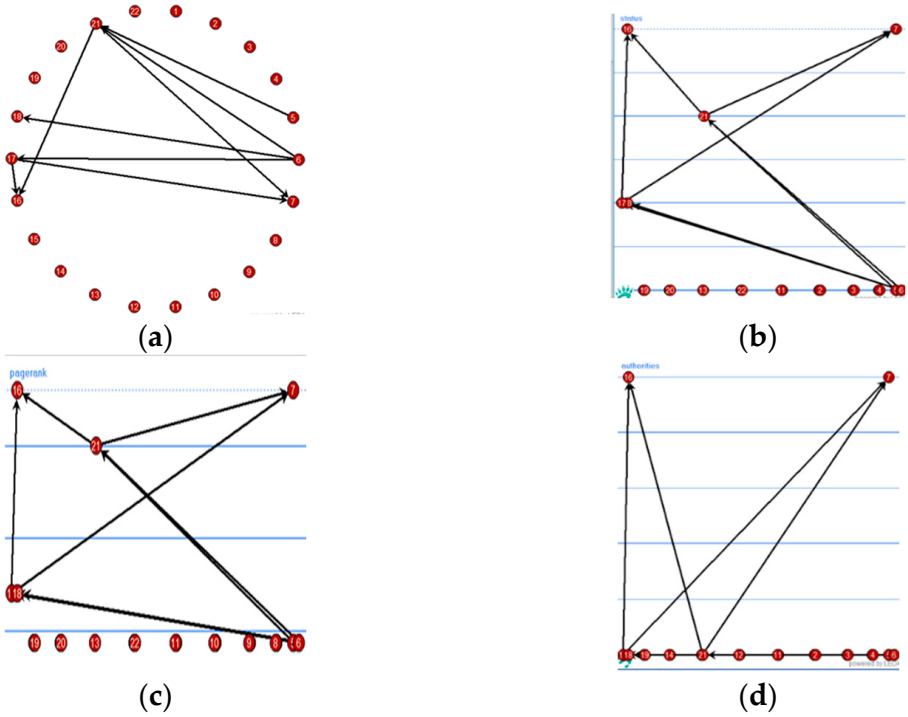

Figure 5. Network of verbal aggressiveness. Basic-circular form of network (**a**), hierarchy of Katz status (**b**), hierarchy of pagerank (**c**), hierarchy of authority (**d**).

Verbal aggressiveness networks with density 1.73% show that destructive relationships are rarer within school community and they manifest in specific interpersonal relationships that do not extend to the whole school network.

Another issue worth raising are the differences observed among hierarchical structures of the same network. In Figures 1–4, hierarchy of authority gives prominence to different nodes in comparison to Katz status and hierarchy of pagerank. This can be attributed to the

fact that although Katz status, pagerank and authority are similar structures, they depict hierarchical positions in different ways. For instance, in the social attractiveness network, while hierarchy of Katz and hierarchy pagerank make nodes 1 and 10 more visible than others, a hierarchy of authority features node 9 as the leading socially attractive node. In this case, Katz status shows the leading socially attractive node who obtains their position due to being directly connected to many others or other socially important nodes. Pagerank status is a distributive hierarchy, indicating transferred value from node to node, and in this particular case, social attractiveness is accumulatively transferred from one socially attractive node to another socially attractive node. Finally, authority hierarchy status indicates the qualified competitiveness a node attracts from other nodes that aim at the same characteristic. For instance, the node appearing to be the leading socially attractive node is the one that is distinguishable from the most socially attractive nodes. However, the hierarchical structures do not depict any differentiations in the verbal aggressiveness network pointing out leading nodes, while targets for verbal aggressiveness remain the same across the hierarchical structures. This may infer that verbal aggressiveness, no matter the hierarchy approach, affects particular nodes.

Finally, leading socially attractive nodes appear at the top of scientific attractiveness networks and social power attractiveness networks as well, suggesting a correlation among these two forms of attractiveness and social power. A potential correlation between physical attractiveness and verbal aggressiveness can be detected comparing Katz status and pagerank hierarchies of physical attractiveness and becoming a target for verbal aggressiveness, respectively.

3.2. Statistical Analysis

In Table 1, females seem to be chosen as academic mentors (0.269) more often than males. The general grade appears as a factor affecting the choice for academic (0.713) or personal mentors (0.341). Distinction at school (0.300) or professionally (0.293), scientific distinction (0.348) and distinction in life (0.307) are positively related to the profile of an academic mentor or an unwillingness to answer about family's financial status (−0.242) is negatively related to the profile of mentor on personal issues. Travelling abroad (−0.413) does not seem to add to the profile of a personal mentor either. Receiving others' sympathy is not correlated to being inspired positively in terms of lessons (−0.229) or opting for physically attractive friends (−0.235). Instead, it is positively related (0.290) to distinction in life.

General grade is positively related to getting others' acceptability during discussions (0.370). Distinction at school (0.239) and a professional distinction (0.225) are factors that seem to determine others' agreement tendency during a discussion. The general grade is negatively related to being a target for weakness during a discussion (−0.324). Being weak during a discussion is negatively correlated to students who aim at inspiring positively in terms of appearance (−0.272). Finally, surfing the net for long hours (0.252) is related to tendency to disagree during a discussion. Being a disputer seems to be a characteristic of students who are neither inspired academically (−0.295) nor opt for smart friends (−0.238).

Place of living seems to be a crucial factor for the emergence of verbal aggressiveness. Students living in town seem to be more often targets for hurting (−0.287) and rude comments (−0.334). Surfing the net for entertainment (−0.252) affects targets for hurting comments as well. Males are usually the targets for threat comments (−0.224) and height also seems to affect targets for threat (0.392).

In Table 2, females are more often scientifically attractive (0.392, 0.254) than males. Height (−0.284) and weight (−0.309, −0.463) seem to be physical characteristics that deter scientific attractiveness. The general grade (0.725, 0.411) acts as a predicting factor for the emergence of scientific attractiveness. Desire to inspire in terms of behavior (0.233), in terms of lessons (0.276, 0.264), in terms of appearance (0.418) and desire for distinction at school (0.418), professional distinction (0.328), scientific distinction (0.365, 0.229), and distinction in life (0.344) are positively related to scientific attractiveness.

Table 1. Personal determinants of authority network properties of argumentativeness, social power and verbal aggressiveness.

Network Variables	Argumentativeness			Social Power			Verbal Aggressiveness			
Non-Network Variables	**Disagreement**	**Agreement**	**Weakness**	**Advice_Lessons**	**Advice_Personal**	**Sympathy**	**Hurt**	**Irony**	**Rudeness**	**Threat**
gender	−0.076	0.102	−0.088	**0.269**	0.142	−0.046	−0.033	0.008	−0.04	**−0.224**
	0.487	0.35	0.415	0.012	0.188	0.674	0.763	0.938	0.716	0.037
height	−0.029	−0.146	−0.013	−0.161	−0.159	−0.001	0.2	0.074	0.219	**0.392**
	0.808	0.219	0.91	0.173	0.179	0.992	0.09	0.535	0.062	0.001
weight	0.011	−0.316	0.066	−0.242	−0.251	−0.171	0.203	0.093	0.153	0.099
	0.928	0.008	0.589	0.043	0.036	0.158	0.091	0.441	0.207	0.414
place of living(town–village)	−0.208	−0.001	0.157	−0.084	−0.15	−0.069	**−0.287**	−0.116	**−0.334**	−0.167
	0.062	0.996	0.162	0.457	0.18	0.539	0.009	0.304	0.002	0.137
financial_status_family	0	0.006	−0.047	−0.235	**−0.242**	−0.049	0.029	−0.114	0.045	−0.056
	0.999	0.958	0.701	0.05	0.044	0.685	0.814	0.349	0.711	0.647
general_grade	−0.177	**0.37**	**−0.324**	**0.713**	**0.341**	0.175	0.011	−0.121	−0.037	0.068
	0.14	0.002	0.006	0	0.004	0.144	0.927	0.314	0.762	0.572
travel_abroad_last_5_years	−0.06	−0.075	−0.103	−0.111	**−0.413**	−0.024	0.003	−0.051	−0.091	−0.114
	0.595	0.505	0.358	0.322	0	0.833	0.976	0.65	0.418	0.311
surf_the_net_entertainment	0.131	−0.087	−0.073	0.079	0.106	0.035	**0.252**	−0.012	0.152	−0.034
	0.249	0.446	0.524	0.491	0.353	0.76	0.025	0.917	0.182	0.769
surf_the_net_hours	**0.252**	0.053	0.068	−0.143	−0.062	−0.078	0.057	0.108	0.202	0.096
	0.033	0.661	0.569	0.231	0.602	0.517	0.636	0.366	0.088	0.421
be_inspired_positively_lessons	−0.15	0.07	0.034	−0.093	0.035	**−0.229**	0.018	−0.067	−0.025	−0.006
	0.191	0.543	0.767	0.42	0.763	0.043	0.875	0.56	0.83	0.96
inspire_positively_lessons	**−0.295**	0.212	−0.07	0.179	0.061	0.043	−0.133	−0.044	−0.121	0.046
	0.01	0.065	0.549	0.122	0.601	0.713	0.254	0.704	0.296	0.694
inspire_positively_appearance	−0.032	0.12	**−0.272**	**0.238**	−0.01	0.124	0.095	−0.07	0.065	−0.001
	0.784	0.303	0.018	0.04	0.929	0.29	0.416	0.55	0.581	0.995
distinction at school	−0.128	**0.239**	−0.09	**0.3**	0.202	0.024	0.037	0.059	0.025	0.113
	0.256	0.032	0.426	0.006	0.071	0.833	0.743	0.603	0.825	0.314
distinction_professional	0.019	**0.225**	−0.151	**0.293**	0.208	0.076	−0.039	0.072	−0.083	0.18
	0.864	0.045	0.18	0.008	0.064	0.501	0.734	0.527	0.466	0.11
scientific distinction	−0.149	0.133	−0.219	**0.348**	−0.043	0.005	−0.073	0.105	0.028	0.067
	0.187	0.241	0.051	0.002	0.705	0.967	0.521	0.353	0.803	0.553
distinction in life	0.151	0.237	−0.595	**0.307**	0.006	**0.29**	0.235	0.214	0.104	0.062
	0.301	0.101	0	0.032	0.966	0.043	0.104	0.139	0.477	0.671
opt for friends_knowledge	0.043	**−0.326**	0.143	−0.143	−0.215	−0.059	0.141	0.07	0.074	−0.062
	0.705	0.003	0.21	0.21	0.057	0.608	0.215	0.542	0.519	0.587
opt for smart friends	**−0.238**	0.088	−0.054	0.095	0.151	0.102	−0.119	−0.094	−0.057	−0.017
	0.035	0.44	0.636	0.406	0.185	0.372	0.296	0.409	0.619	0.883
opt for attractive friends	0.061	−0.157	0.048	0.057	−0.134	**−0.235**	−0.033	−0.056	0.114	0.098
	0.596	0.17	0.676	0.621	0.243	0.038	0.777	0.627	0.319	0.392

Note: The values in bold represent statistical significance among personal determinants of authority network properties of argumentativeness, social power and verbal aggressiveness.

Table 2. Personal determinants of authority network properties of attractiveness.

Network Variables	Scientific Attractiveness		Social Attractiveness		Physical Attractiveness	
Non-Network Variables	**Help_Homework**	**Help_Homework_ Others**	**Friendly_to_ You**	**Friendly_to_ Others**	**Attractive_to_ You_**	**Attractive_to_ Others_**
gender	**0.329**	**0.254**	**−0.047**	0.099	0.197	0.129
	0.002	0.018	0.668	0.361	0.068	0.233
height	−0.167	**−0.284**	0.14	−0.038	−0.029	−0.058
	0.157	0.015	0.236	0.749	0.805	0.626
weight	**−0.309**	**−0.463**	0.014	−0.093	−0.228	−0.194
	0.009	0	0.907	0.444	0.057	0.108
financial_status_family	−0.198	−0.233	−0.095	−0.075	**−0.285**	**−0.246**
	0.1	0.052	0.433	0.539	0.017	0.041
general_grade	**0.725**	**0.411**	0.243	**0.453**	0.032	0.047
	0	0	0.041	0	0.791	0.696
travel_abroad_last_5_years	−0.12	−0.13	−0.142	**−0.266**	−0.216	−0.165
	0.285	0.249	0.208	0.016	0.053	0.14
surf_the_net_hours	**−0.256**	−0.163	0.004	−0.093	0.225	**0.236**
	0.03	0.171	0.974	0.435	0.058	0.046
inspire_positivelt_behaviour	**0.233**	0.123	0.033	−0.03	−0.055	−0.019
	0.04	0.285	0.777	0.792	0.634	0.868
inspire_positively_lessons	**0.276**	**0.264**	0.119	0.17	0.029	0.051
	0.016	0.021	0.308	0.143	0.806	0.661
inspire_positively_appearance	**0.277**	0.176	−0.04	0.017	0.193	0.182
	0.016	0.131	0.732	0.883	0.097	0.119

Table 2. *Cont.*

Network Variables	Scientific Attractiveness		Social Attractiveness		Physical Attractiveness	
Non-Network Variables	**Help_Homework**	**Help_Homework_ Others**	**Friendly_to_ You**	**Friendly_to_ Others**	**Attractive_to_ You_**	**Attractive_to_ Others_**
distinction at school	**0.418**	0.14	0.156	**0.246**	−0.105	−0.015
	0	0.212	0.165	0.027	0.353	0.893
distinction _professional	**0.328**	0.025	0.108	**0.257**	−0.103	−0.024
	0.003	0.825	0.338	0.021	0.364	0.832
scientific distinction	**0.365**	**0.229**	0.094	0.118	−0.044	−0.081
	0.001	0.041	0.409	0.297	0.701	0.475
distinction in life	**0.344**	0.265	0.003	−0.009	0.253	0.236
	0.015	0.065	0.985	0.952	0.08	0.103
opt for friends with knowledge	−0.202	**−0.258**	−0.215	**−0.261**	−0.101	−0.13
	0.074	0.022	0.057	0.02	0.376	0.252
opt for smart friends	0.093	0.122	**0.251**	0.109	0.045	0.018
	0.414	0.283	0.026	0.338	0.695	0.875
opt for attractive friends	−0.047	−0.203	−0.13	−0.178	**−0.257**	−0.134
	0.68	0.074	0.256	0.118	0.023	0.241

Note: The values in bold represent statistical significance among personal determinants of authority network properties of attractiveness.

Males are socially attractive (−0.047) more often than females. The general grade (0.453) is positively related to social attractiveness. A distinction at school (0.246) and a professional distinction (0.257) is correlated to social attractiveness. Opting for friends with knowledge does not seem to favor social attractiveness but opting for smart friends (0.251) seems to foster social attractiveness. Finally, travelling abroad (−0.266) does not seem to promote social attractiveness.

An unwillingness to answer about the family financial status (−0.285, −0.246) is negatively related to physical attraction.

In Table 3, scientific attractiveness is positively related to social attractiveness (0.458, 0.236) and physical attractiveness (0.266). It is a strong indicator of the emergence of power as it is positively related to academic mentoring (0.810, 0.495), personal mentoring (0.481, 0.232) and sympathy (0.428, 0.308). Finally, it is negatively related to verbal aggressiveness and more specifically, irony (−0.324), rudeness (0.212) and threat (−0.510). Scientific attractiveness is positively related to acceptability during a discussion (0.519, 0.298). Social attractiveness is positively related to social power in the case of academic mentoring (0.367, 0.326), personal mentoring (0.448, 0.430) and sympathy (0.437, 0.331), acceptability during a discussion (0.614, 0.639) but is negatively related to being a disputer during a discussion. Physical attractiveness is positively related to social power in the case of personal mentoring (0.417, 0.319) and sympathy (0.455, 0.413) to acceptability during a discussion (0.388, 0.328) and to scientific attractiveness (0.278, 0.266). Social attractiveness and physical attractiveness do not seem to relate to verbal aggressiveness. Most forms of verbal aggressiveness positively relate to being a disputer during a discussion (0.416, 0.311). Finally, all forms of verbal aggressiveness are related to one another. For example, using hurting comments is positively related to the use of irony (0.324), to rudeness (0.734) and threat (0.360). Irony is related to rudeness (0.353), threat (0.243) and rudeness to threat (0.409).

Table 3. Relation among authority network properties of attractiveness, verbal aggressiveness and argumentativeness.

	Argumentativeness			**Social Power**				**Verbal Aggressiveness**			**Scientific Attractiveness**		**Social Attractiveness**		**Physical Attractiveness**	
	Disagreement	**Agreement**	**Weakness**	**Advice_ Lessons**	**Advice_ Personal**	**Sympathy**	**Hurt**	**Irony**	**Rudeness**	**Threat**	**Help_ Homework**	**Help_Homework_ Others**	**Friendly_ to_You**	**Friendly_ to_Others**	**Attractive_ to_You_**	**Attractive_ to_Others**
disagreement	1 -	**−0.342** 0.001	0.136 0.208	−0.206 0.056	−0.098 0.369	**−0.215** 0.045	**0.416** -	**0.311** 0.003	**0.419** -	0.172 0.112	**−0.313** 0.003	**−0.235** 0.028	**−0.375** -	**−0.246** 0.022	0.050 0.648	−0.053 0.629
agreement	**−0.342** 0.001	1 -	**−0.355** **0.001**	**0.345** 0.001	**0.494** -	**0.536** -	−0.173 0.108	−0.126 0.246	−0.106 0.330	0.041 0.708	**0.519** -	**0.298** 0.005	**0.614** -	**0.639** -	**0.388** -	**0.328** 0.002
weakness	0.136 0.208	**−0.355** 0.001	1 -	**−0.430** -	−0.038 0.723	**−0.494** -	−0.029 0.788	0.149 0.169	0.008 0.945	0.036 0.741	**−0.474** -	−0.191 0.077	−0.180 0.095	−0.173 0.108	**−0.215** 0.046	−0.142 0.189
advice_lessons	−0.206 0.056	**0.345** 0.001	**−0.430** 0.000	1 -	**0.359** 0.001	**0.328** 0.002	−0.099 0.361	−0.184 0.087	−0.069 0.525	−0.065 0.547	**0.810** -	**0.495** -	**0.367** -	**0.326** 0.002	0.208 0.053	0.133 0.221
advice_personal	−0.098 0.369	**0.494** -	−0.038 0.723	**0.359** 0.001	1 -	**0.385** -	−0.038 0.729	−0.076 0.486	- 0.996	0.089 0.412	**0.481** -	**0.232** 0.031	**0.448** -	**0.430** -	**0.417** -	**0.319** 0.003
sympathy	−0.215 0.045	**0.536** -	**−0.494** 0.000	**0.328** 0.002	**0.385** -	1 -	0.027 0.802	−0.125 0.248	0.110 0.309	0.032 0.766	**0.428** -	**0.308** 0.004	**0.437** -	**0.331** 0.002	**0.455** -	**0.413** -
hurt	**0.416** 0.000	−0.173 0.108	−0.029 0.788	−0.099 0.361	−0.038 0.729	0.027 0.802	1 -	**0.324** 0.002	**0.734** 0.000	**0.360** 0.001	0.019 0.861	−0.202 0.060	−0.116 0.285	−0.162 0.134	0.141 0.192	0.075 0.490
irony	**0.311** 0.003	−0.126 0.246	0.149 0.169	−0.184 0.087	−0.076 0.486	−0.125 0.248	**0.324** 0.002	1 -	**0.353** 0.001	**0.243** 0.023	−0.112 0.303	**−0.324** 0.002	−0.034 0.752	−0.099 0.363	−0.020 0.856	−0.098 0.367
rudeness	**0.419** 0.000	−0.106 0.330	0.008 0.945	−0.069 0.525	0 0.996	0.110 0.309	**0.734** -	**0.353** 0.001	1 -	**0.409** -	−0.034 0.752	−0.212 0.049	−0.091 0.400	−0.032 0.769	0.059 0.590	0.033 0.762
threat	0.172 0.112	0.041 0.708	0.036 0.741	−0.065 0.547	0.089 0.412	0.032 0.766	**0.360** 0.001	**0.243** 0.023	**0.409** -	1 -	0.021 0.848	−0.044 0.685	0.239 0.026	0.068 0.533	0.038 0.724	−0.033 0.762
help_homework	**−0.313** 0.003	**0.519** -	**−0.474** -	**0.810** -	**0.481** -	**0.428** -	0.019 0.861	−0.112 0.303	−0.034 0.752	0.021 0.848	1 -	**0.510** -	**0.458** -	**0.371** -	**0.278** 0.009	0.119 0.273
help_homework_others	**−0.235** 0.028	**0.298** 0.005	**−0.191** 0.077	**0.495** -	**0.232** 0.031	**0.308** 0.004	−0.202 0.060	**−0.324** 0.002	**−0.212** 0.049	−0.044 0.685	**0.510** -	1 -	**0.236** 0.028	0.198 0.066	**0.266** 0.013	0.194 0.071
friendly_to_you	**−0.375** -	**0.614** -	−0.180 0.095	**0.367** 0	**0.448** -	**0.437** -	−0.116 0.285	−0.034 0.752	−0.091 0.400	0.239 0.026	**0.458** -	**0.236** 0.028	1 -	**0.646** -	0.184 0.087	0.074 0.495
friendly_to_others	**−0.246** 0.022	**0.639** 0.000	−0.173 0.108	**0.326** 0.002	**0.430** -	**0.331** 0.002	−0.162 0.134	−0.099 0.363	−0.032 0.769	0.068 0.533	**0.371** -	0.198 0.066	**0.646** -	1 -	0.098 0.368	0.028 0.800
attractive_to_you	0.050 0.648	**0.388** -	**−0.215** 0.046	0.208 0.053	**0.417** -	**0.455** -	0.141 0.192	−0.020 0.856	0.059 0.590	0.038 0.724	**0.278** 0.009	**0.266** 0.013	0.184 0.087	0.098 0.368	1 -	**0.783** -
attractive_to_others	−0.053 0.629	**0.328** 0.002	−0.142 0.189	0.133 0.221	**0.319** 0.003	**0.413** -	0.075 0.490	−0.098 0.367	0.033 0.762	−0.033 0.762	0.119 0.273	0.194 0.071	0.074 0.495	0.028 0.800	**0.783** -	1 -

Note: The values in bold represent statistical significance among authority network properties of attractiveness, verbal aggressiveness and argumentativeness.

In Table 4, specific behavioral types are 'the untargeted powerful' and 'the targeted powerful'. The first one consists of social attractiveness (0.778, 0.754), physical attractiveness (0.296, 0.348) and scientific attractiveness (0.396). They concentrate social power as academic mentors (0.607), personal mentors (0.539) and sympathetic personalities (0.594) who simultaneously are acceptable during a discussion (0.838). The second type is recognized as socially attractive (265, 0.236) and scientifically attractive (0.260). They seem to be socially powerful as personal mentors (0.236). However, they become targets for verbal aggressiveness, attracting rudeness (0.346) and threat (0.335).

Table 4. Typology of targets (authority network properties).

PCA		The Untargeted Powerful	The Targeted Powerful
Social Power	Agreement	**0.838**	0.039
	Advice lessons	**0.607**	0.151
	Sympathy	**0.594**	0.085
	Advice personal	**0.539**	**0.236**
Social Attraction	Friendly to you	**0.778**	**0.265**
	Friendly to others	**0.754**	**0.236**
Scientific Attraction	Help homework others	**0.396**	**0.260**
Physical Attraction	Attractive to others	**0.296**	−0.834
	Attractive to you	**0.348**	−0.785
Argumentativeness	Disagreement	−0.489	0.103
	Weakness	−0.317	0.099
Verbal Aggression	Rudeness	−0.282	**0.346**
	Threat	−0.112	**0.335**

Note: the values in bold symbolize statistical significance among authority network porerties of being a target of attractiveness, aggressiveness, social power and argumentativeness

3.3. Content Analysis of Open-Ended Questions

The school students (50 boys, 38 girls) from a high-school institution in Trikala, Greece were examined in this study. Table 5 illustrates the overall total number of valid (complete) responses on the research questionnaire for the open-ended questions of friendship, attractiveness, argumentativeness and verbal aggressiveness, respectively. A total of 13 students provided responses to the open-ended question: 'What characteristics should one have to be your friend?', with a total of 19 open-ended comments and codes (some comments contain more than one code; therefore, there are more codes than the total number of individual responses recorded). A total of 45 students responded the open-ended question: 'How do you perceive "attractiveness"?', with a total of 45 open-ended comments and codes. Moreover, 42 students responded to the open-ended question: 'How do you perceive "argumentativeness"?', with a total of 42 comments and codes and finally, 66 students responded the question: 'How do you perceive "verbal aggressiveness"?', with a total of 66 comments and codes. The least addressed question was that of friendship, concentrating less answers in comparison to the other three questions. This may be explained by the fact that students may feel that it is a commonplace concept that they do not need to further clarify.

Table 5. Data and codes generated.

Network Variables	Friendship	Attractiveness	Argumentativeness	Verbal Aggressiveness
Respondents	13	45	42	66
Open-ended comments and codes generated	19	45	42	66

Tables 6–9 suggest how students' open-ended comments have been distributed. The ranking process reveals the emphasis that students have collectively focused on issues of importance through their own responses. Codes in friendship, attractiveness, argumentativeness and verbal aggressiveness, respectively, are categorized to discover the common elements concerning students' perception. Seven categories are developed out of codes for friendship, attractiveness, argumentativeness and ten categories for verbal aggressiveness. These categories are arranged into thematic groups: two thematic groups for friendship, six thematic groups for attractiveness, three thematic groups for argumentativeness and four thematic groups for verbal aggressiveness.

Table 6. Code category, ranking and frequency list of friendship.

Ranking	Categories	Code Counts	Percent	Theme Group
1	Behaviour and character	6	31%	Traits of personality
2	Confidentiality	3	16%	Traits of personality
3	Sense of humor	3	16%	Traits of personality
4	Fairness	2	10.5%	Traits of personality
5	Peace and quiet	2	10.5%	Traits of personality
6	Respectfulness	2	10.5%	Traits of personality
7	Regular contact	1	5.5%	Traits of friendships

Table 7. Code category, ranking and frequency list of attractiveness.

Ranking	Categories	Code Counts	Percent	Theme Group
1	Combination of physical appearance, character, personality and behavior	12	30%	Physical and social attractiveness
2	Attractive physical appearance	9	22.5%	Physical attractiveness
3	Mutual attractiveness	8	20%	Similarity- attraction principle
4	Confidentiality	5	12.5%	Power
5	Smart and helpful	3	7.5%	Scientific attractiveness
6	Companion	2	5%	Social attractiveness
7	Similar interests	1	2.5%	Similarity-attraction principle

Table 8. Code category, ranking and frequency list of argumentativeness.

Ranking	Categories	Code Counts	Percent	Theme Group
1	Use of arguments	17	40.5%	Arguing
2	Persuasion	9	21.5%	Arguing
3	Support an opinion	7	16%	Arguing
4	Justification–explanation	4	9.5%	Arguing
5	Proof	2	5%	Arguing
6	Public speaking	2	5%	Speaking ability
7	Excuses	1	2.5%	Other

Table 9. Code category, ranking and frequency list of verbal aggressiveness.

Ranking	Categories	Code Counts	Percent	Theme Group
1	Swearing	30	45%	Verbal aggressiveness
2	Derogatory comments	10	15%	Verbal aggressiveness
3	Humiliating others	7	11%	Verbal aggressiveness
4	Hurting comments	5	8%	Verbal aggressiveness
5	Pushing–Forcing out	3	4.5%	Physical aggressiveness
6	Facial aggression	3	4.5%	Non-verbal aggressiveness
7	Violence	2	3%	Physical aggressiveness
8	Irony	2	3%	Verbal aggressiveness
9	Bullying and cyber-bullying	2	3%	Bullying
10	Threat	2	3%	Verbal aggressiveness

In Table 6, the findings regarding friendship indicate that traits of personality represent the most significant concern for students. Overwhelmingly, the concept of a combination of 'behavior and character' strongly emerged from the data by 31%. For example:

'Be a good person with nice character who treats me well' (43). Others raised 'confidentiality' (16%) and 'sense of humor' (16%) and quite a few referred to 'fairness' (10.5%), 'peace and quiet' (10.5%) and 'respectfulness' (10.5%) as important characteristics of their friends' personality. Moreover, comments on traits of friendship relationship contain the issue of 'regular contact' with friends, for example: 'To spend time together' (10).

In Table 7, physical and social attractiveness is presented as a combination of 'physical appearance, character, personality and behavior' and has been acknowledged as the main concept (30%) of what attractiveness represents for students. For example: 'a mature character with gentle personality and nice physical appearance' (27). Physical attractiveness is described by some students as 'attractive physical appearance' and an important concept of attractiveness (22.5%). For example: 'body and overall look' (41). Regarding similarity, students referred to 'mutual attractiveness' (20%) as a basic component. For example: 'be compatible with the other' (88) 'Similar interests' (2.5%) were mentioned as well: 'the dreams we share' (6). Apart from that, 'confidentiality' in the form of trust was mentioned as an important aspect of attractiveness (12,5%). For example: 'Gain my trust and prove to be trustworthy doing good deeds' (3). Furthermore, scientific attractiveness is mentioned by a few students (7.5%), who believe that being attractive is enhanced by someone's skills and willingness to assist others. For example: 'smart and helpful' (33) or 'wise and helpful' (35). Finally, social attractiveness is perceived as companionship and was mentioned by few students (5%). For example: 'entice you to be in their company' (39).

In Table 8, argumentativeness is described by respondents who identified different aspects of arguing as basic components of argumentativeness, with the 'use of arguments' (40.5%), 'persuasion' (21.5%) and 'supporting an opinion' (16%) being the most prevalent. For example: 'Someone expresses their opinion, using arguments that others cannot contradict' (21) or 'During a discussion, the interlocutor uses arguments to prove that they are right' (32). Justification (9.5%) and proof (5%) arose from fewer responses. For example: 'Justifying what you say' (50) or 'tangible proof' (56). Concerning speaking ability, 5% of respondents provided comments suggesting that argumentativeness is related to the public speaking ability. For example: 'Craftsmanship in public speaking with the aim to persuade' (63). Other elements of argumentativeness were mentioned by few respondents reporting the 'use of excuses' (2.5%) interpreting argumentativeness as 'many excuses' (47) that someone may resort to in order to support themselves.

In Table 9, various dimensions of aggressiveness are depicted. The responses indicated that the following are important forms of verbal aggressiveness for students: 'Swearing' (45%), 'Derogatory comments' (15%), 'Humiliation' (11%), 'Hurting comments' (8%), able 'Irony' (3%) and 'Threat' (3%). For example: 'Putting pressure on someone with swearing

or deriding comments' (31) or 'Ridiculing, being unfair and humiliating others with your words' (39). Of concern, 4.5% of respondents provided comments suggesting the non-verbal expressions that may accompany verbal aggressiveness as verbal aggressiveness itself. Particularly, facial expressions were identified as manifestations of verbal aggressiveness. For example: 'Staring at you with meanness' (3). Physical aggressiveness also constitutes a particular theme group. The potential upshot of verbal aggressiveness as physical aggressiveness is mentioned. For example: 'Pushing out' (6) or 'Violence' (88). Bullying (including cyber bullying) is described as a manifestation of verbal aggressiveness in the final theme.

Tables 10–13 summarize the sub-themes of each category. Simultaneously, they provide detailed description of the sub-themes.

Table 10. Friendship summary of sub-themes.

Categories	Sub-Themes
Behavior and character	Nice behavior; human behavior; nice character; being serious
Confidentiality	Keep secrets; trustworthy; gain one's trust; discretion
Sense of humour	Fun to be around; make others laugh
Fairness	Just; not exploit others
Peace and quiet	Not being nervous; not give on one's nerves
Respectfulness	Respect others' choices
Regular contact	Spend time together

Table 11. Attractiveness summary of sub-themes.

Categories	Sub-Themes
Combination of physical appearance, character, personality and behaviour	Beauty of body and character; beauty, character, behaviour; mature character, gentle personality, outer beauty; something on someone or their character that attracts; nice appearance, behaviour, respectfulness and being gentle; physical appearance and character
Attractive physical appearance	Body that attracts; physical characteristic that attracts; look at someone more often than at others
Retrospective attractiveness	When you attract and are attracted; attract and be attracted in a friendly or romantic relationship; be compatible with someone;
Confidentiality	Gain confidence by showing love and affection through deeds;
Smart and helpful	Smart and helpful; smart, wise, gentle
Companion	Others want to approach you and spend time with you
Similar interests	The dreams we share

Table 12. Argumentativeness summary of sub-themes.

Categories	Sub-Themes
Use of arguments	The use of arguments during a discussion to show that someone is right; logical and strong arguments
Persuasion	Persuade in a nice way and suggest something; use of arguments that make others agree; make others listen to you; persuade others follow;
Support an opinion	Support an opinion with arguments; support an opinion and others cannot contradict; support something
Justification–explanation	Justify what they say;
Proof	Prove that you are right; concrete proof; nice explanation
Public speaking	Skillfulness at speaking
Excuses	Many excuses

Table 13. Verbal aggressiveness summary of sub-themes.

Categories	Sub-Themes
Swearing	Swearing; swearing and spreading rumors; swear someone that may be better than me; talking dirty; bad phrases
Derogatory comments	Make others feel bad about themselves using comments on their appearance or clumsiness
Humiliating others	Making someone feel bad about themselves by laughing at them;
Hurting comments	Hurting by what they say; words that hurt; phrases that hurt
Pushing–Forcing out	Pushing others with no reason; pushing others while swearing; verbal abuse;
Facial aggression	Staring at people aggressively
Violence	Violence and non-ethical behavior
Irony	Ironic comments;
Bullying and cyber bullying	Bullying and cyber bullying
Threat	Attack by threatening

4. Discussion and Conclusions

The aim of this study was to use content analysis of open-ended questions in order to further clarify the results of social network and statistical analysis regarding interpersonal attractiveness and verbal aggressiveness among secondary school students of physical education. Strategically combining qualitative and quantitative work may increase our understanding in practice [57] creating an interaction between induction and deduction [52].

One of the conclusions that this study comes to is the close relationship that exists between scientific and social attractiveness, with the subsequent emergence of power for students who combine these two forms of attractiveness. This is depicted in the social network hierarchical forms of social and scientific attractiveness that share the same nodes at their top. It is obvious in the correlation of network variables that scientific attractiveness is strongly related to social attractiveness and appears to be a factor for the emergence of academic and personal power while physical appearance seems to be a positive adding factor. What content analysis of the open-ended question 'How do you perceive attractiveness?' reveals is that characteristics other than physical attractiveness come to the forefront. A combination of personality and behavioral components seem to comprise attractiveness indicating a direct relationship between social and scientific attractiveness and social power as well, since confidentiality appears to assure important number of responses regarding attractiveness. Physical attractiveness remains one of the most significant aspects of attractiveness, but the content analysis shows that it falls behind a combination of its two other dimensions. This is further clarified by the content analysis of the question regarding 'friends' characteristics. Here the physical attractiveness is absent from the desired traits and students have focused on the traits of personality with behavior, character and confidentiality scoring high on the list, although in other content analysis studies physical attractiveness appears to be the most frequently expressed form of interpersonal attraction [58]. Nezlek et al. [59] found that conscientiousness defined as reliability, organization and fulfillment of plans strongly relates to rewarding social interpersonal interactions. Lösch and Rentzsch [60] state that social and academic domains share common ground in case of interpersonal perception in classroom with conscientiousness being strongly related to the academic popularity. Singh et al. [8] pointed out the importance of trust for interpersonal attraction. A mentor aids identification in interpersonal relationships [61], while an extrovert and socially attractive is judged more favorably in a work-related interaction [62]. Thus, it is apparent that content analysis of open-ended questions not only confirms the network and statistical analysis but goes further in-depth by depicting the internal thoughts of students and clarifying the reasons why these relationships appear in this particular way.

The second basic conclusion that this study draws is that becoming a target for verbal aggressiveness may include any forms of verbal aggressiveness such as hurt, irony, rudeness and threat. This was evident in the social network analysis and in the correlation analysis of network variables, where all forms of verbal aggressiveness are interrelated. Brann et al. [31] have identified nine types of verbally aggressive communication used in an educational context such as competence attacks, work ethic attacks, swearing, threats, character attacks, non-verbal behaviors, teasing, background attacks and physical appearance attacks. The results are consistent with the study [22] concerning verbal aggressiveness networks of physical education students in the University of Thessaly suggested five distinct types of verbal aggressiveness victims: (a) "general black sheep" who are attacked almost for every reason, (b) "contemptible type" who get others' irony, (c) "bagger type" who are attacked due to their background, (d) "victim of mockers" who are aimed mainly by degrading comments and (e) "victim of serial criticizers" who are the victim of those using verbal aggressiveness in all aspects of their communication. The Content analysis of the open-ended question 'How do you perceive verbal aggressiveness?' validated that these are the most usual forms of verbal aggressiveness manifestations but revealed other important aspects as well. First, it revealed the mechanism that verbal aggressiveness uses and has to do with the manipulation of the target through derogation and humiliation, which is high on the ranking and frequency list of verbal aggressiveness as well as the means through which it is achieved for the victims of verbal aggressiveness such as facial expressions, violence and bullying. This shows that students not only realize what verbal aggressiveness stands for, but they can assume the outcome for the victims and how they can be afflicted. Students' answers to this open-ended question also gave rise to the reasons why someone may be verbally victimized, and this is "appearance or clumsiness" and excellence: "may be better than me". This is consistent with the findings of the correlation analysis between the network and the non-network variables that revealed a negative correlation between height as a physical characteristic and targeting for threat. The PCA analysis suggested that "the untargeted powerful" differs from "the targeted powerful" in that they are physically attractive. This suggests that one may be socially and scientifically attractive, concentrating social power as a mentor, but an element of physical appearance may provoke verbal aggressiveness. Physical characteristics such as weight and height that may turn someone into a target for verbal aggressiveness have been pointed out in [63] as well. Savoleinen et al. [62] state that physical characteristics increase the risk of interpersonal victimization.

Furthermore, in our study, argumentativeness proves to be a latent component of attractiveness and verbal aggressiveness which contributes to explaining the grid of relationships developed. Argumentativeness is related to [64,65]. Being a disputer is closely related to most forms of verbal aggressiveness and negatively to scientific and social attraction in our study. "The targeted powerful" is a disputer and considered weak during a discussion lacking argumentative skills. The content-analysis of the open-ended question 'How do you perceive argumentativeness?' clearly indicates that persuasion and supporting an opinion comes high on the list of students' responses. Argumentativeness thus leads to acceptability during a discussion and grows one's popularity scientifically and socially as well as academic and personal advising power. Instead, lack of persuasion decreases one's attractiveness or mentoring profile [16] also indicated argumentative deficiency as a reason for verbal aggressiveness and it has been supported that verbal aggressiveness and argumentativeness through network analysis had similar effects [66,67]. Syrmpas and Bekiari [15] studied the positive relationship between argumentativeness and interpersonal attraction and the negative between argumentativeness and aggressiveness while [68] stressed that argumentativeness facilitates learning.

Finally, the content analysis of open-ended questions clarifies the relationship of non-network and network variables of Spearman analysis. For instance, the general grade, desire to inspire in terms of lessons and behavior, tendency to distinction at school and professionally or in life or opting for smart friends are strongly related to social and scientific

attractiveness but do not seem to relate to physical attractiveness and verbal aggressiveness. Muñoz Reyes det al. [69] referred to the negative association between academic performance and sociality, while [70] state that popularity reduces in instances of verbal aggressiveness. The fact that students state in their open-ended responses that they are attracted mainly by others' personality, character, behavior, smartness, helpfulness and secondarily by their appearance or that in the first place they appreciate their friends' character, behavior, humor, fairness, and respectfulness by not mentioning physical appearance indicates consistency between the results with the content analysis assisting the explanatory depiction of the above relationships.

Practically, scientific/attractiveness can reflect the school culture, based on principles that adhere to scientific progress and collaboration for students and may be incorporated in the school guidelines reflecting school values and culture. Special care should be given to students training in the development of a scientific and collaborative profile that is going to follow them at the next levels of their academic or vocational training. Being scientifically and task attractive proves to be a latent skill that should be given space to burgeon at school environment. Moreover, the integration of verbal aggressiveness avoidance scheme would facilitate (social) learning and academic progress. In physical education, knowing the "star" students both in attractiveness and aggressiveness may enhance the management of teams by trainers who can handle the position of the team players more effectively, adjusting in the synthesis of teams which can improve team performance.

In conclusion, approaching attractiveness and aggressiveness using both network analysis that sketches relationships as structures–hierarchies, and content analysis that carves phenomena in depth can be considered a serendipity, allowing to move to a different level of sociological research. Certain limitations of this study consist in the restricted sample as well as in the restricted region. Thus, a challenge of future research would be an extension of sampling on more school classes in order to enable an age-oriented or education level comparison. The sample could also be extended on various regions (centre–suburb, urban–rural, island–continental, plain-mountainous areas etc.) or on diverse milieus and socio-economic groups in order to compare the effect of social, economic and cultural factors on the individual behavior. Additionally, a qualitative comparative analysis among lower-, middle- and higher-layers of centralities within each network (student class) may also be a basis of future study.

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References

1. Berscheid, E.; Reis, H.T. Attraction and close relationships. In *Handbook of Social Psychology*, 4th ed.; Gilbert, D.T., Ed.; Oxford University Press: New York, NY, USA, 1998; pp. 193–281.
2. McCroskey, J.C.; Hamilton, P.R.; Weiner, A.N. The effect of interaction behavior on source credibility, homophily, and interpersonal attraction. *Hum. Commun. Res.* **1974**, *1*, 42–52. [CrossRef]
3. Berscheid, E.; Walster, E.H. *Interpersonal Attraction*; Addison-Wesley: Reading, MA, USA, 1969.

4. Hogan, R.J.; Roberts, B.W. A socioanalytic perspective on person-environment. In *Person-Environment Psychology: New Directions and Perspectives*, 2nd ed.; Lawrence Erlbaum Associates: Mahwah, NJ, USA, 2000; pp. 1–24.
5. Li, N.P.; Bailey, J.M.; Kenrick, D.T.; Linsenmeier, J.A. The necessities and luxuries of mate preferences: Testing the tradeoffs. *J. Personal. Soc. Psychol.* **2002**, *82*, 947. [CrossRef]
6. Fehr, B. Friendship formation. In *Handbook of Relationship Initiation*; Sprecher, A.W.S., Harvey, J., Eds.; Psychology Press: New York, NY, USA, 2008; pp. 29–54.
7. Campbell, K.; Holderness, N.; Riggs, M. Friendship chemistry: An examination of underlying factors. *Soc. Sci. J.* **2015**, *52*, 239–247. [CrossRef] [PubMed]
8. Singh, R.; Jen Ho, L.; Tan, H.L.; Bell, P.A. Attitudes, personal evaluations, cognitive evaluation and interpersonal attraction: On the direct, indirect and reverse-causal effects. *Br. J. Soc. Psychol.* **2007**, *46*, 19–42. [CrossRef] [PubMed]
9. Sunnafrank, M.; Ramirez, A., Jr. At first sight: Persistent relational effects of get-acquainted conversations. *J. Soc. Pers. Relatsh.* **2004**, *21*, 361–379. [CrossRef]
10. van Zalk, M.; Denissen, J. Idiosyncratic versus social consensus approaches to personality: Self-view, perceived, and peer-view similarity. *J. Personal. Soc. Psychol.* **2015**, *109*, 121–141. [CrossRef] [PubMed]
11. Winch, R.F.; Ktsanes, T.; Ktsanes, V. The theory of complementary needs in mate-selection: An analytic and descriptive study. *Am. Sociol. Rev.* **1954**, *19*, 241–249. [CrossRef]
12. Aron, A.; Aron, E.N. *Handbook of Personal Relationships: Theory, Research and Intervention, Self-Expansion Motivation and Including Other in the Self*; John Wiley and Sons Inc.: New York, NY, USA, 1997; pp. 251–270.
13. Aydin, I.E. Relationship between Affective Learning, Instructor Attractiveness and Instructor Evaluation in Videoconference-Based Distance Education Courses. *Turk. Online J. Educ. Technol.-TOJET* **2012**, *11*, 247–252. Available online: https://files.eric.ed.gov/fulltext/EJ989274.pdf (accessed on 27 January 2020).
14. Myers, S.A.; Horan, S.M.; Kennedy-Lightsey, C.D.; Madlock, P.E.; Sidelinger, R.J.; Byrnes, K.; Frisby, B.; Mansson, D.H. The relationship between college students' self-reports of class participation and perceived instructor impressions. *Commun. Res. Rep.* **2009**, *26*, 123–133. [CrossRef]
15. Syrmpas, I.; Bekiari, A. The Relationship between Perceived Physical Education Teacher's Verbal Aggressiveness and Argumentativeness with Students' Interpersonal Attraction. *Inq. Sport Phys. Educ.* **2015**, *13*, 21–32. Available online: http://research.pe.uth.gr/emag/index.php/inquiries/article/view/160 (accessed on 20 February 2017).
16. Infante, D.A.; Rancer, A.S. Argumentativeness and verbal aggressiveness: A review of recent theory and research. *Ann. Int. Commun. Assoc.* **1996**, *19*, 319–352. [CrossRef]
17. Deliligka, S.; Bekiari, A.; Syrmpas, I. Verbal aggressiveness and argumentativeness in physical education: Perceptions of teachers and students in qualitative and quantitative exploration. *Psychology* **2017**, *8*, 1693–1717. [CrossRef]
18. Avtgis, T.A.; Rancer, A.S. *Arguments, Aggression, and Conflict: New Directions in Theory and Research*; Routledge: New York, NY, USA, 2010.
19. Bekiari, A.; Hasanagas, N. Suggesting indicators of superficiality and purity in verbal aggressiveness: An application in adult education class networks of prison inmates. *Open J. Soc. Sci.* **2016**, *4*, 279–292. [CrossRef]
20. Myers, S.A.; Brann, M.; Martin, M.M. Identifying the content and topics of instructor use of verbally aggressive messages. *Commun. Res. Rep.* **2013**, *30*, 252–258. [CrossRef]
21. Rancer, A.S.; Avtgis, T.A. *Argumentative and Aggressive Communication: Theory, Research, and Application*; Sage Publications, Inc.: Thousand Oaks, CA, USA, 2006.
22. Bekiari, A.; Hasanagas, N. Verbal aggressiveness exploration through complete social network analysis: Using physical education students' class as an illustration. *Int. J. Soc. Sci. Stud.* **2015**, *3*, 30–49. [CrossRef]
23. Aloia, L.S.; Solomon, D.H. Emotions Associated with Verbal Aggression Expression and Suppression. *West. J. Commun.* **2015**, *80*, 3–20. [CrossRef]
24. Infante, D.A. Teaching students to understand and control verbal aggression. *Commun. Educ.* **1995**, *44*, 51–63. [CrossRef]
25. Samp, J.A. *Communicating Interpersonal Conflict in Close Relationships: Contexts, Challenges, and Opportunities*; Routledge: London, UK, 2016.
26. Bekiari, A.; Spyropoulou, S. Exploration of Verbal Aggressiveness and Interpersonal Attraction through Social Network Analysis: Using University Physical Education Class as an Illustration. *Open J. Soc. Sci.* **2016**, *4*, 145–155. Available online: http://www.scirp.org/journal/PaperInformation.aspx?PaperID=67520&#abstract (accessed on 1 May 2022). [CrossRef]
27. Bekiari, A.; Kokaridas, D.; Sakellariou, K. Associations of students' self-reports of their teachers' verbal aggression, intrinsic motivation, and perceptions of reasons for discipline in Greek physical education classes. *Psychol. Rep.* **2006**, *98*, 451–461. [CrossRef]
28. Bekiari, A. Perceptions of instructor's verbal aggressiveness and physical education students' affective learning. *Percept. Mot. Ski.* **2012**, *115*, 325–335. [CrossRef]
29. Bekiari, A.; Patsiaouras, A.; Kokaridas, D.; Sakellariou, K. Verbal aggressiveness and state anxiety of volleyball players and coaches. *Psychol. Rep.* **2006**, *99*, 630–634. [CrossRef] [PubMed]
30. Infante, D.A.; Wigley, C.J., III. Verbal aggressiveness: An interpersonal model and measure. *Commun. Monogr.* **1986**, *53*, 61–69. [CrossRef]

31. Brann, M.; Edwards, C.; Myers, S.A. Perceived instructor credibility and teaching philosophy. *Commun. Res. Rep.* **2005**, *22*, 217–226. [CrossRef]
32. Bekiari, A.; Petanidis, D. Exploring teachers' verbal aggressiveness through interpersonal attraction and students' intrinsic motivation. *Open J. Soc. Sci.* **2016**, *4*, 72–85. [CrossRef]
33. Moolenaar, N.M.; Daly, A.J.; Sleegers, P.J. Occupying the principal position: Examining relationships between transformational leadership, social network position, and schools' innovative climate. *Educ. Adm. Q.* **2010**, *46*, 623–670. [CrossRef]
34. Brown, C.; Daly, A.; Liou, Y.H. Improving trust, improving schools: Findings from a social network analysis of 43 primary schools in England. *J. Prof. Cap. Community* **2016**, *1*, 69–91. [CrossRef]
35. Daly, A.J.; Moolenaar, N.M.; Bolivar, J.M.; Burke, P. Relationships in reform: The role of teachers′ social networks. *J. Educ. Adm.* **2010**, *48*, 359–391. [CrossRef]
36. Theocharis, D.; Bekiari, A. Dynamic Analysis of Verbal Aggressiveness Networks in School. *Open J. Soc. Sci.* **2018**, *6*, 14–28. [CrossRef]
37. Theoharis, D.; Bekiari, A.; Koustelios, A. Exploration of Determinants of Verbal Aggressiveness and Leadership through Network Analysis and Conventional Statistics. Using School Class as an Illustration. *Sociol. Mind* **2016**, *7*, 27–43. [CrossRef]
38. Ruggiero, T.E.; Lattin, K.S. Intercollegiate female coaches′ use of verbally aggressive communication toward African American female athletes. *Howard J. Commun.* **2008**, *19*, 105–124. [CrossRef]
39. Kerr, J.H.; Grange, P. Athlete-to-athlete verbal aggression: A case study of interpersonal communication among elite Australian footballers. *Int. J. Sport Commun.* **2009**, *2*, 360–372. [CrossRef]
40. Kuckartz, U. *Qualitative Text Analysis: A Guide to Methods, Practice and Using Software*; Sage: Thousand Oaks, CA, USA, 2014.
41. Scott, J. Social network analysis. *Sociology* **1988**, *22*, 109–127. [CrossRef]
42. Scott, J. *Social Network Analysis: A Handbook*, 2nd ed.; Sage: London, UK, 2000.
43. Heidler, R.; Gamper, M.; Herz, A.; Eßer, F. Relationship patterns in the 19th century: The friendship network in a German boys' school class from 1880 to 1881 revisited. *Soc. Netw.* **2014**, *37*, 1–13. [CrossRef]
44. Popitz, H. *Phänomene der Macht*; Mohr Siebeck: Tübingen, Germany, 1992.
45. Bekiari, A.; S. Deliligka, A.; Vasilou, A.; Hasanagas, N. Socioeducational Determinants of "Bad Behaviour" of Students: A Comparative Analysis among Primary, Secondary, and High School. *Int. J. Learn. Divers. Identities* **2019**, *26*, 1–19. [CrossRef]
46. Friborg, O.; Rosenvinge, J.H. A comparison of open-ended and closed questions in the prediction of mental health. *Qual. Quant.* **2013**, *47*, 1397–1411. [CrossRef]
47. Popping, R. Analyzing open-ended questions by means of text analysis procedures. *Bull. Sociol. Methodol./Bull. Méthodol. Sociol.* **2015**, *128*, 23–39. [CrossRef]
48. Meitinger, K.; Behr, D.; Braun, M. Using apples and oranges to judge quality? Selection of appropriate cross-national indicators of response quality in open-ended questions. *Soc. Sci. Comput. Rev.* **2019**, *39*, 315–334. [CrossRef]
49. McColl, E.; Jacoby, A.; Thomas, L.; Soutter, J.; Bamford, C.; Steen, N.; Thomas, R.; Harvey, E.; Garratt, A.; Bond, J. Design and use of questionnaires: A review of best practice applicable to surveys of health service staff and patients. *Health Technol. Assess.* **2001**, *5*, 1–256. [CrossRef]
50. Given, L.M. *The Sage Encyclopedia of Qualitative Research Methods*; Given, L.M., Ed.; Sage: Thousand Oaks, CA, USA, 2008.
51. Silverman, D. What counts as qualitative research? Some cautionary comments. *Qual. Sociol. Rev.* **2013**, *9*, 48–55. [CrossRef]
52. Aspers, P.; Corte, U. What is qualitative in qualitative research. *Qual. Sociol.* **2019**, *42*, 139–160. [CrossRef]
53. Goodwin, J.; Horowitz, R. Introduction: The methodological strengths and dilemmas of qualitative sociology. *Qual. Sociol.* **2002**, *25*, 33–47. [CrossRef]
54. Schreier, M. *Qualitative Content Analysis in Practice*; Sage: Thousand Oaks, CA, USA, 2012.
55. Neuendorf, K. *The Content Analysis Guidebook*; Sage Publications: Thousand Oaks, CA, USA, 2017.
56. Radiker, S.; Kuckartz, U. *Focused Analysis of Qualitative Interviews with MAXQDA: Step by Step*; MAXQDA Press: Berlin, Germany, 2020.
57. Lamont, M.; Ann, S. Methodological pluralism and the possibilities and limits of interviewing. *Qual. Sociol.* **2014**, *37*, 153–171. [CrossRef]
58. Bevan, J.L.; Galvan, J.; Villasenor, J.; Henkin, J. You've been on my mind ever since": A content analysis of expressions of interpersonal attraction in Craigslist. Org's Missed Connections posts. *Comput. Hum. Behav.* **2016**, *54*, 18–24. [CrossRef]
59. Nezlek, J.B.; Schütz, A.; Schröder-Abé, M.; Smith, C.V. A cross-cultural study of relationships between daily social interaction and the five-factor model of personality. *J. Personal. Soc. Psychol.* **2011**, *79*, 811–840. [CrossRef]
60. Lösch, T.; Rentzsch, K. Linking Personality with Interpersonal Perception in the Classroom: Distinct Associations with the Social and Academic Sides of Popularity. *J. Res. Personal.* **2018**, *75*, 83–93. [CrossRef]
61. van Veelen, R.; Eisenbeiss, K.K.; Otten, S. Newcomers to social categories: Longitudinal predictors and consequences of ingroup identification. *Personal. Soc. Psychol. Bull.* **2016**, *42*, 811–825. [CrossRef]
62. Savolainen, J.; Brauer, J.R.; Ellonen, N. Beauty is in the eye of the offender: Physical attractiveness and adolescent victimization. *J. Crim. Justice* **2020**, *66*, 1–11. [CrossRef]
63. Salminen, M.; Henttonen, P.; Ravaja, N. The role of personality in dyadic interaction: A psychophysiological study. *Int. J. Psychophysiol.* **2016**, *109*, 45–50. [CrossRef]

64. Cole, J.G.; McCroskey, J.C. The association of perceived communication apprehension, shyness, and verbal aggression with perceptions of source credibility and affect in organizational and interpersonal contexts. *Commun. Q.* **2003**, *51*, 101–110. [CrossRef]
65. Lybarger, J.E.; Rancer, A.S.; Lin, Y. Superior–Subordinate Communication in the Workplace: Verbal Aggression, Nonverbal Immediacy, and Their Joint Effects on Perceived Superior Credibility. *Commun. Res. Rep.* **2017**, *34*, 124–133. [CrossRef]
66. Bekiari, A.; Nikolaidou, Z.A.; Hasanagas, N. Typology of Motivation and Aggression on the Basis of Social Network Variables: Examples of Complementary and Nested Behavioral Types through Conventional Statistics. *Soc. Netw.* **2017**, *6*, 135–147. [CrossRef]
67. Vasilou, A.; Bekiari, A.; Hasanagas, N. Aggressiveness networks at school classes: Dynamic analysis and comparison of structures. *Int. J. Interdiscip. Educ. Stud.* **2020**, *15*, 1–22. [CrossRef]
68. Bekiari, A.; Balla, K. Instructors and Students Relations: Argumentativeness, Leadership and Goal Orientations. *Open J. Soc. Sci.* **2017**, *5*, 128–143. [CrossRef]
69. Muñoz Reyes, J.A.; Guerra, R.; Polo, P.; Cavieres, E.; Pita, M.; Turiégano, E. Using an evolutionary perspective to understand the relationship between physical aggression and academic performance in late adolescents. *J. Sch. Violence* **2019**, *18*, 39–48. [CrossRef]
70. Yavuzer, Y.; Karataş, Z. Associations between popularity and aggression in Turkish early adolescents. *Curr. Psychol.* **2021**, *40*, 1–10. [CrossRef]