

Attractiveness and aggressiveness: implementing social network analysis in physical education classes

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Abstract:

The objective of this study was to detect combinations of interpersonal attractiveness, social power and verbal aggressiveness during physical education and to point out their determinants. A sample of five students' networks (secondary education) was collected (117 nodes, 64 = boys 53 = girls) using standardized questionnaires. The questionnaires consisted of the network part (relationships of attractiveness, aggressiveness, power developed among students: each student replied about the particular relationship developed with each and every student in their network) and the non-network part (non-network determinants such as age, weight, gender, place of birth, living, family financial status etc.). Social Network Analysis, Spearman test and PCA were implemented. Results: All forms of interpersonal attractiveness are interrelated and correlated to social power. Verbal aggressiveness is negatively related to attractiveness and power. Scientific/task attractiveness may protect from becoming a target of verbal aggressiveness. Good general grade at school and aiming at distinction are the main determinants of emerging attractiveness and power and deterrents of verbal aggressiveness. Females seem scientifically attractive and chosen as mentors more often than males. The types of targets and actors of attractiveness, power, argumentativeness and verbal aggressiveness are proposed. The targets are: "the interpersonally attractive mentor" who is physically, socially and task/scientifically attractive, argumentative and protected from verbal aggressiveness and "the physically attractive target" who is only physically attractive and is verbally targeted. The types of actors are: "the socialized troublemaker" who may be verbally aggressive at times but tends to be attracted and mentored by others and "the lonely coercer" who is marginalized, using verbal aggressiveness and tends not to be mentored and attracted by others.

Key Words: attractive, aggressive, student, power, argumentativeness, networks, school physical education

Introduction

Group work is prominent in physical education (Lafont 2012, Barker et al. 2015, Ward and Lee 2005) and this presupposes relations developed among group members. Understanding the grid of relationships in PE classes can generate a better understanding of PE practice. Siedentop (1994) points out that affiliation in a group or a team determines the context for personal growth. Affiliation requires relationships which within PE classes may be characterized with attractiveness, aggressiveness and power.

Interpersonal communication and interpersonal attractiveness are interrelated (Berscheid and Reis 1998). Interpersonal attractiveness consists of three dimensions: a) social attractiveness, based on personal liking b) scientific/task attractiveness, trust based on collaboration desire and c) physical attractiveness, based on appearance (McCroskey and McCain 1974). Many studies have focused on the conditions under which interpersonal attractiveness arises (Krause et al. 2014, Malloy 2018). Several studies have focused on the relation between personality traits and interpersonal attractiveness (Wrzus and Mehl 2015, Selfhout et al. 2010, Van der Linden et al. 2010, Zhao et al. 2015, Bevan et al. 2015, Brunson et al. 2016, Cemalcilar et al. 2018, Losch and Rentzsch, 2018) or the stages which familiarity and interpersonal attractiveness undergo (Finkel et al. 2015) and the determinants of attractiveness (Nezlek et al. 2011, Brumbaugh et al. 2014, Sortheix and Lonnqvist 2015, Talley and Temple 2015, Matey 2016, Li et al. 2017, Rodrigues et al. 2017, Alves 2018, Kim 2018). On the other hand, argumentativeness and verbal aggressiveness are two sides of the same coin since argumentativeness aims at the interlocutor's positions whereas verbal aggressiveness aims at the interlocutor's self-concept (Infante et al. 2011, Guerrero and Gross 2014, Mumford et al. 2019).

All relationships, friendly or not, are imbued with power. Popitz describes a model consisting of four types of power: a) power of action: bodily superiority or violence based on the potential vulnerability of human beings. b) instrumental power/power of external control: ability to give and take (resources, affection, knowledge, etc.) and the possibility to give gratification or punishment. c) authoritative power/power of internalized control, agreement of others due to the trust they show in one's face. d) power of data constitution, the power to constitute and control data (Popitz 1992: 24–33; Teymoori, 2020).

So far, regarding physical education, the positive relationship between argumentativeness and interpersonal attractiveness (Syrmpas and Bekiari 2015, 2018) and the negative relationship between

aggressiveness and students' motivation or orientation in PE have been studied (Bekiari et al. 2005, 2006a; Bekiari et al. 2006b, Bekiari et al. 2006c, Bekiari 2012, Bekiari et al. 2015, Deliligka et al. 2017). The interdependence of emotionality, anxiety, aggressiveness and subjective control in professional training has been indicated (Popovych et al., 2022). Coaches' verbal aggressiveness as an influential behavioral trait that influences athletes' perception and feelings has also been studied (Syrmpas and Bekiari, 2018). Similarly, coaches' leadership behavior affects athletes' perceptions, feelings and performance. Network analysis has also taken place in several cases considering holistic structures of argumentativeness, verbal aggressiveness and attractiveness. Particularly, Bekiari and Hasanagas (2016) offered network results which point out that communication brims with aggressive behaviour. Determinants of attractiveness in relation to socio-personal traits such as gender, pedagogic influence and age were explored as structural phenomena (Hasanagas and Bekiari 2015, Bekiari et al 2019a, 2019b). In addition, Bekiari and Spyropoulou (2016) investigated the network effects of interplay between verbal aggressiveness and interpersonal attractiveness in higher education PE departments.

The academic added value of this study lies in the exploration of structures of attractiveness, aggressiveness and power focusing on the interplay of their dimensions in details as well as in the detection of particular types of respective targets and actors during PE classes of secondary education. The practical added value consists in the investigation of determinants of attractiveness and aggressive behaviours. Thereby, insights are expected to be provided to physical educators of schools in order to handle such phenomena more effectively.

Methods and materials

Methodology

Network analysis based on algebraic approach along with conventional statistics are used. Interpersonal relations formulate hierarchies among students (nodes) by algebraic indicators. Each class of n-students is a network of n-nodes and is depicted as a polygon (n-gon) illustrating the created social structures with its diagonals to represent the relations of attractiveness, power, argumentativeness and verbal aggressiveness among students. These variables of the students are processed with network indicators (algorithms). Indicators were calculated and normalized (%) by software Visone 1.1. Their formulas are easily accessible in the web and presented here as well.¹ Their structural meaning is as follows: In-degree and out-degree are defined as occasional hierarchy, indicating directly contacted nodes of attraction, power, argument and verbal aggressiveness. Katz-status is defined as accumulative hierarchy position calculated as a chain of successive relations, indicating deeper situations than in- and out-degree. Pagerank is defined as distributive hierarchy position indicating transferred value from node to node, such as being attracted. Authority is defined as qualified competitiveness indicating nodes who attract links of many other students developing intensive and not occasional relations.

Sample and questionnaires

This research has applied non-random network sampling with the aim to detect structures and not self-perceptual data. The aim of this study has not been descriptive but analytic statistics (correlations). This is not deemed as a weakness but as an advantage since correlations are not descriptive ones like generalisations that are based on the total population but indicative of tendencies which may have generalised effectiveness.

¹ 1

- $\rho(G) = \frac{m}{n(n-1)}$ (*density*), [G=graph, m=number of links, n(n-1)=number of possible links]
 - $c_{iD}(v) = \sum_{e=(u,v)} \omega(e)$ (*indegree*), $c_{oD}(v) = \sum_{e=(v,u)} \omega(e)$ (*outdegree*)
- [directed graph: $G=(V,E)$, where V =nodes, E =links, ω =weights, number of links $\#E = \sum_{u,v \in V} \omega(u,v)$, a link $e \in E$ connects 2 nodes $u, v \in V$, $\omega: x \rightarrow \mathbb{R}$, $x \in \{V, E\}$, $x \in X$, $\omega(x)$]
- $c_{ks}(v) = a \cdot \sum_{(u,v) \in E(v)} \omega((u,v)) \cdot (1 + c_{ks}(u))$ (*Katz status*)
- where $\frac{1}{\alpha} = \min \{ \max_{u \in V} \text{in deg}_{\omega}(v), \max_{u \in V} \text{out deg}_{\omega}(v) \}$
- $c_{PR}(v) = \alpha \frac{1}{n} + (1-a) \sum_{(u,v) \in E(v)} \omega((u,v)) \cdot c_{PR}(u)$ (*pagerank*)
- where $0 < a < 1$ is a free parameter
- $c_A(v) = \frac{1}{\lambda} \cdot \sum_{(u,v) \in E(v)} \omega((u,v)) \cdot (\sum_{(u,w) \in E_u} \omega((u,w)) \cdot c_E(w))$ (*authority*)
- where λ is the largest eigenvalue of $A^T A$, A: the adjacency matrix of the graph G, T: natural numbers

Five physical education classes from secondary education in Trikala were chosen (88 nodes in total). Standardised questionnaires were distributed and answered by students during their classes avoiding any disturbance of the teaching programme, after permission of the responsible authority (Institute of Educational Policy in Ministry of Education, Greece). Students' parents have signed a special consent form prior to the day of participation in the survey as students were under-18s. The questionnaire consisted of two parts: a) non-network variables, examining the personal features of students (e.g. gender, place of living etc.) and b) network variables (relations of interpersonal attractiveness, power, argumentativeness and verbal aggressiveness which may experience among them). The network part of questionnaire was based on the following tested questionnaires of Verbal Aggressiveness Scale and Interpersonal Attraction Scale. Additional questions were added to the above questionnaires, about trust (advising about study issues) and argumentativeness (weakness during a discussion).

Statistical Analysis

Visone 1.1. was used in order to process the network data in order to extract the values of in-degree, out-degree, pagerank and authority for every node. Both non-network and network variables were entered in SPSS 21. Spearman test was used [$p \leq 0.01$ (*) and $p \leq 0.05$ (**)]. This bivariate test was preferable to multivariate analysis as it is a non-parametric test. The centrality values of nodes (not of ties) have been correlated with non-network variables and with each other (techniques like QAP or ERGM are not necessary in study, as it focuses on correlations concerning centralities of nodes and not ties among nodes. Finally, in order to reveal behavioural patterns (typology), Principal component analysis was implemented.

Results

In figure 1, 2, 3, 4, 5, 6 the basic circle form along with several structures (hierarchies of Katz status, pagerank and authority) of argumentativeness, interpersonal attractiveness and verbal aggressiveness are presented.

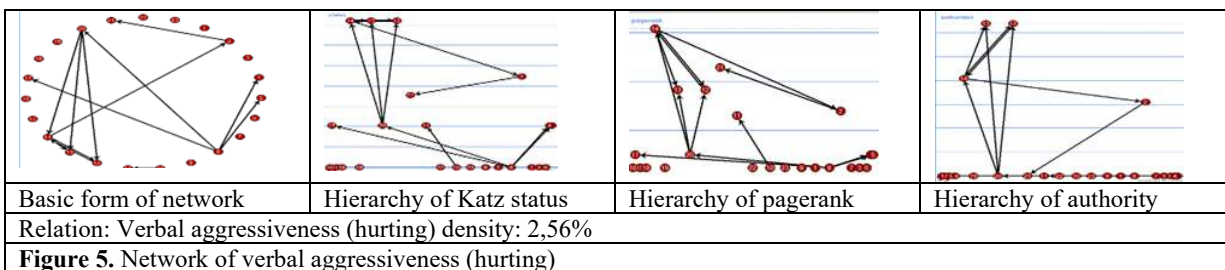
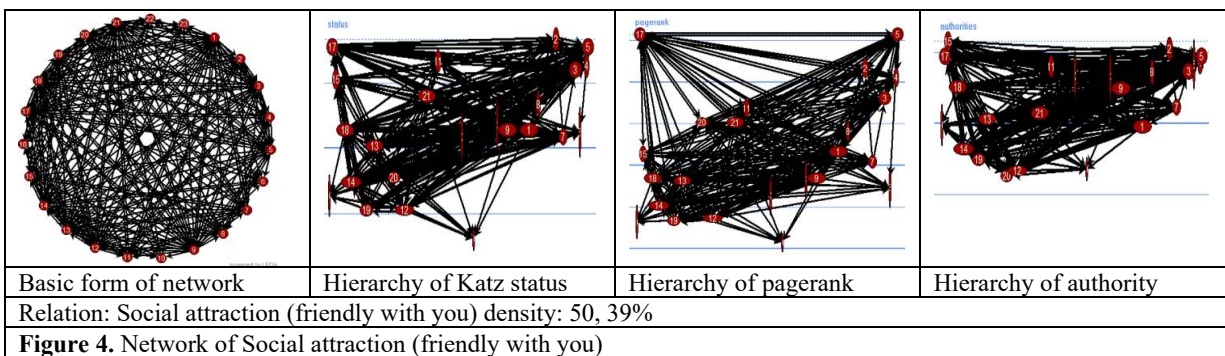
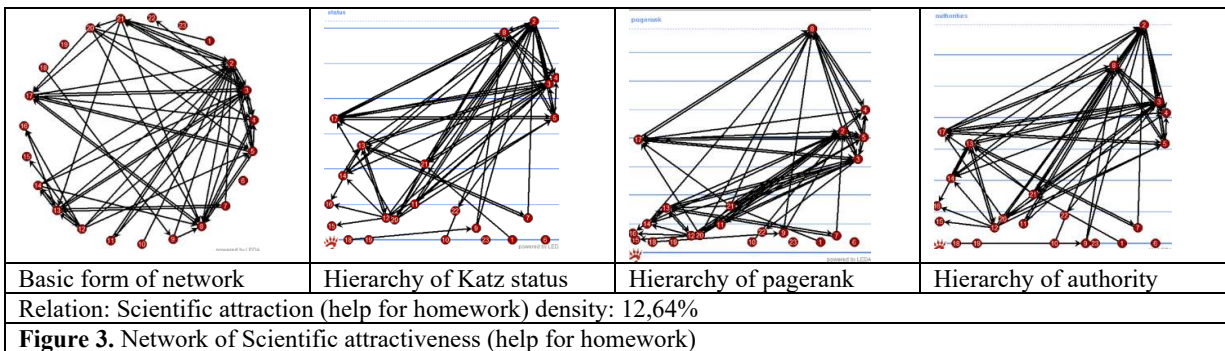
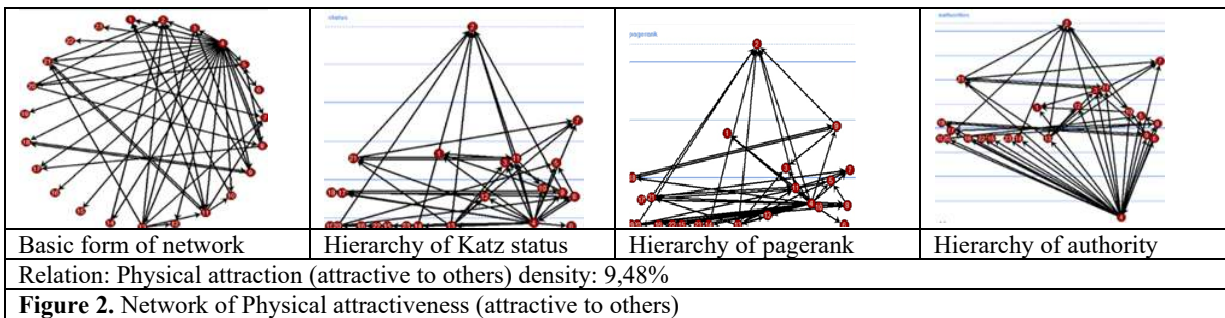
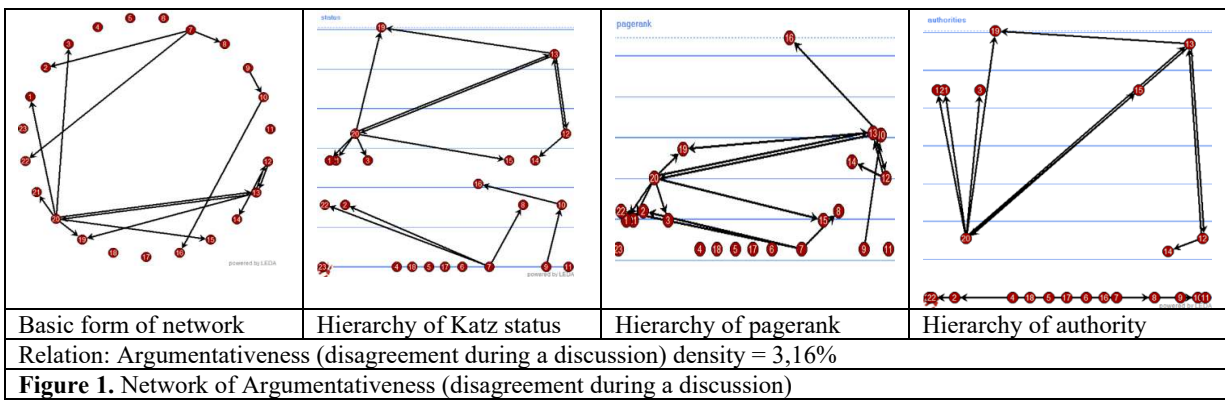
Density differences can be observed between networks. In figure 2, 3, 4, networks of attraction (9,48%, 12,64%, 50,39%) are denser than these of verbal aggressiveness (2,56%) in figure 5 and argumentativeness (3,16%) in figure 1. This can be attributed to the fact that students who implement negative, harmful behaviours do not usually outnumber those demonstrating positive behaviours and school is a place of socialization, not of conflict development.

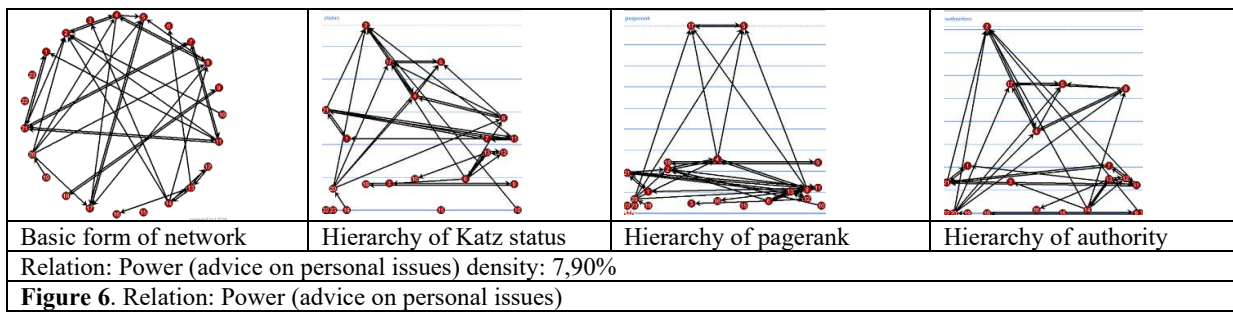
In figure 1, nodes high in the hierarchy of disagreement during a discussion are absent from any other kind of attractiveness hierarchy. It seems that the deficiency of argumentative skills during a discussion may lead disputers during sport lessons to the exclusion from socialization and consequently from the possibility of making oneself available for any kind of attractiveness. Argumentativeness may add to one's profile, making them attractive but the lack of it may add to an aggressive profile. Physical, social, scientific attraction and power seem to share the same nodes at the top of their hierarchy, indicating that different forms of attractiveness and power can be correlated contrary to the hierarchies of verbal aggressiveness and argumentativeness whose top nodes do not appear high in the hierarchies of attractiveness at the same time.

Regarding hierarchical forms, in figure 2, 3, 4 students on the top of physical attractiveness are simultaneously on the top of scientific attractiveness and social attractiveness. Physically attractive nodes are selected at a more intimate level as friends or as collaborators at sports or for the completion of tasks at school. This indicates a correlation between physical, social and scientific attractiveness since friendliness, addressing for help at school and physical attractiveness are represented by the same nodes during PE classes. In addition, nodes appearing to be collaborators for study issues due to being high in scientific attractiveness, also display other characteristics of physical or social attractiveness.

Looking for advice on academic issues seems to be related with the criteria applied in terms of friendship as well. All forms of physical attractiveness seem to be related to social power in the form of trust. Students high at the hierarchy of advice in figure 6 are also leading nodes in physical, social and scientific attractiveness beyond PE classes.

However, nodes on the top of verbal aggressiveness in figure 5 do not appear on the top of other attractiveness hierarchies. The profile of the verbally aggressive student consists of a combination of demonstrated behaviours like offense, irony, rudeness and threat. Verbally aggressive students during PE classes are neither physically nor socially attractive or a choice for academic advice, and this is partly explained by the fact that verbally aggressive nodes are on the top of disagreement hierarchies as well. Students who feel unattractive physically, socially or academically may resort to different forms of verbal aggressiveness or become disputers in order to compensate for their weakness.





In Table 1, it is observable that trust and sympathy are components of power either in academic or personal issues. Mentors who gain others' trust in academic issues tend to have a good general grade at school (.708), distinction in studies (.300), in professional career (.301), in science (.359) and in life generally (.319).

Women seem to be chosen more often as mentors on academic issues (.276). Mentors who gain others' trust in personal issues also tend to have a good general grade at school (.432), are interested in studies (.279) and in seeking a professional career (.273).

Weight is negatively correlated to gain one's trust in personal issues (-.272). Travelling abroad does not seem to be positively related to the profile of a mentor in personal issues (-.279). Again, the women can act as mentors in academic issues more often than men (.300).

Those who gain others' sympathy and have sympathy reputation aim at distinction in life (.348) and seem to be respected due to their attitude.

Students who are considered scientifically attractive, subjectively or objectively, usually have a good general grade (.692, .469), inspire positively at lessons (.320, .367) and appearance (.328, .311), aim at scientific distinction (.353, .221) and success in life generally (.377, .311). They also opt for friends who are gentle and friendly (.254, .295) but not for friends with knowledge (-.249). Women seem to be more often scientifically attractive (.347, .321). Surfing the net for long hours is negatively related to scientific attraction (-.235) contrary to internet surfing for study purposes (.296).

Finally, overweight students seem to be scientifically unattractive (-.291, .405). Socially attractive students, subjectively and objectively, usually have a good general grade at school (.316, .511) but they do not appear to choose friends with knowledge (-.250, -.229).

Objectively attractive students have not travelled abroad for the last five years (-.285), they think that they inspire in terms of lessons (.278) and they aim at professional distinction (.250). Physically attractive students think that they inspire others with their appearance (.290), do not opt for friends with knowledge (-.243) and female seem to be considered physically attractive more often than male (.326).

Those who gain acceptability during a discussion have a good general grade at school (.327) and desire distinction as students (.247), but do not opt for friends with knowledge (-.276). Disputers during a discussion do not seem to have a good general grade (-.345), inspire in terms of lessons (-.285) or any desire for distinction as students (-.250). Students reputed for weakness during a discussion do not seem to have a good general grade either (-.277), they do not inspire positively by their appearance (-.252) and do not opt for friends with knowledge (-.541).

Targets of verbal aggressiveness and subsequently accusers of experiencing it who receive hurting comments are usually tall (.250) or overweight (.240) and live in urban space (-.322). Targets of verbal aggressiveness who are threatened seem to be tall (.418), to have a low general grade (-.308) and mostly are male (-.352).

Table 1. Relation among network determinants of being a target of attractiveness, verbal aggressiveness argumentativeness and power among secondary school students and non-network determinants (sum = indegree + Katz status + pagerank + authority)

	Attractiveness						Verbal aggressiveness				Argumentativeness			Power		
	Scientific attractiveness		Social attractiveness		Physical attractiveness		hurt	irony	rudeness	threat	disagree	agree	weak	advise	advise personal	sympathy
	help from network	help from network/ others	friendly to	friendly to others	attract you	attract others										
Height	-.174	-.202	.077	.051	-.023	-.085	.250	.146	.270	.418	.019	.023	.100	-.136	-.087	.018
	.142	.087	.516	.670	.850	.477	.033	.218	.021	.000	.882	.850	.402	.253	.463	.881
Weight	-.291	-.405	-.182	-.095	-.200	-.214	.240	.100	.148	.192	.003	-.167	.158	-.240	-.272	-.151
	.014	.000	.132	.436	.097	.076	.045	.411	.220	-.112	.980	.168	.193	.046	.023	.211
Place of living (Town=1, village=2)	-.181	.101	-.007	.016	-.074	-.180	-.322	-.101	-.222	-.054	-.040	.039	.106	-.142	-.150	-.121
	.105	.372	.948	.888	.510	.107	.003	.369	.047	.629	.736	.732	.346	.207	.181	.283
General grade	.692	.469	.316	.511	.091	.169	-.004	-.103	-.193	-.308	-.345	.327	-.277	.708	.432	.218
	.000	.000	.007	.000	.449	.159	.974	.391	.107	.009	.005	.005	.019	.000	.000	.068
Travel abroad	-.127	-.089	-.203	-.285	-.163	-.167	.000	-.053	-.009	-.174	.042	-.126	.048	-.124	-.279	-.036
	.260	.430	.069	.010	.146	.137	.999	.637	.933	.120	.725	.261	.673	.271	.012	.746
Surf the net studies	.154	.296	.001	.126	.066	.057	-.056	.063	-.004	-.136	.004	.033	-.105	.206	.148	.007
	.174	.008	.993	.264	.559	.616	.623	.976	.970	.229	.976	.771	.355	.066	.191	.948
Surf the net hours	-.235	-.135	-.019	-.152	.165	.155	.055	.076	.241	.200	.172	.066	-.019	-.115	-.087	-.085
	.047	.257	.876	.202	.166	.195	.649	.523	.041	.093	.168	.579	.871	.334	.466	.476
Inspire lessons	.320	.367	.121	.278	.112	.003	-.138	-.131	-.203	-.147	-.285	.120	-.076	.168	.169	.114
	.005	.001	.298	.015	.337	.978	.234	.260	.078	.205	.019	.300	.516	.146	.144	.327
Inspire appearance	.328	.311	.019	.027	.290	.122	.075	-.042	.006	-.103	-.119	.127	-.252	.265	.087	.206
	.004	.007	.874	.818	.012	.296	.520	.720	.962	.379	.338	.278	.029	.022	.459	.076
Desire for distinction as student	.373	.118	.152	.214	-.005	.143	.049	-.010	-.086	-.186	-.250	.247	-.068	.300	.229	.095
	.001	.294	.174	.055	.962	.202	.664	.931	.447	.096	.033	.026	.549	.006	.040	.399
Desire for distinction as professional	.330	.080	.159	.250	-.026	.021	.047	.073	-.127	-.139	-.164	.188	-.157	.301	.273	.118
	.003	.481	.159	.025	.819	.853	.680	.522	.263	.218	.164	.096	.164	.007	.014	.296
Desire for distinction as scientist	.353	.221	.108	.139	.096	.039	-.042	.025	-.092	-.062	-.175	.113	-.189	.359	.062	.092
	.001	.049	.339	.219	.397	.734	.713	.824	.419	.586	.138	.320	.093	.001	.584	.415
Desire for distinction in life generally	.377	.311	.056	.129	.268	.094	.209	.198	.141	.155	.084	.255	-.541	.319	.132	.348
	.008	.029	.703	.375	.062	.519	.150	.172	.334	.288	.582	.077	.000	.026	.365	.014
Opt for friends with knowledge	-.249	-.210	-.250	-.229	-.138	-.243	.053	.107	.169	-.043	.034	-.276	.195	-.210	-.292	-.101
	.027	.063	.026	.042	.227	.031	.642	.349	.137	.707	.777	.014	.085	.064	.009	.376
Opt for friends with kindness	.254	.295	.045	.098	.036	.065	-.078	-.094	-.081	-.001	-.008	.197	-.077	.089	.193	.062
	.024	.008	.695	.389	.755	.569	.492	.411	.478	.995	.950	.082	.502	.435	.088	.588
Gender (male=1, female=2)	.347	.321	.110	.168	.326	.197	.045	.049	-.013	-.352	.007	.040	-.103	.276	.300	.063
	.001	.002	.309	.119	.002	.067	.682	.655	.905	.001	.952	.715	.344	.010	.005	.561

In Table 2, students who practice verbal aggressiveness, and subsequently are accused of practicing hurt, irony or threat, are inspired by others in terms of appearance (.247, .239, .243) and opt for physically attractive friends (.236, .227). Those practicing hurt do not opt for friends who may sacrifice for them (-.258). Those accused of rudeness are inspired positively in terms of lessons (.247) and behaviour (.271) but do not opt for intelligent friends (-.298). Actors of threat do not have a good general grade (-.354).

Students who are disputable, inspire by appearance (.286) and are inspired positively in terms of lessons by others (.241). Students prone to weakness during a discussion opt for physically attractive friends (.330) and inspire others regarding appearance (.339). Finally, students who demonstrate proneness to agreement do not seem to inspire in terms of lessons (-.285).

Respectfulness in terms of physical attraction is positively related to general grade (.234) but not to opting for friends who make sacrifices (-.245). Scientific respectfulness is positively related to general grade (.233) and to appearance (.260).

Table 2. Relation among network determinants of being an actor of attractiveness, verbal aggressiveness, argumentativeness and power among secondary school students and non-network determinants (outdegree)

	Argumentativeness			Power			Verbal aggressiveness				Scientific attractiveness		Social attractiveness		Physical attractiveness	
	disagreement	agreement	weakness	advise lessons	advise personal	sympathy	hurt	irony	rudeness	threat	help to network	help to network/ others	friendly to you	friendly to others	attract you	attract others
general grade	.143	.199	.126	.046	.229	.206	.124	.037	.136	-.354	.233	.095	.079	-.018	.217	.234
	.235	.095	.297	.702	.055	.085	.302	.761	.259	.002	.050	.432	.513	.879	.069	.049
be inspired positively lessons	.241	-.074	-.112	-.086	.065	-.191	.072	.100	.247	.157	.078	-.043	-.084	-.033	-.025	.019
	.033	.518	.327	.453	.573	.094	.531	.384	.029	.169	.497	.710	.465	.772	.829	.869
be inspired positively appearance	.129	-.072	.140	.036	.168	.128	.247	.239	.138	.243	.143	-.126	.024	.001	.121	-.030
	.259	.531	.220	.754	.142	.263	.029	.035	.228	.032	.213	.270	.833	.993	.292	.796
inspire positively behaviour	.206	-.120	.140	.008	-.028	-.127	.067	.154	.271	.093	.206	.130	.143	.083	.042	.002
	.070	.294	.220	.944	.806	.269	.560	.179	.016	.416	.070	.258	.213	.470	.715	.987
inspire positively lessons	.207	-.285	-.001	-.262	-.059	-.194	.185	.005	.119	.059	-.015	.043	-.051	-.153	.037	-.008
	.073	.013	.992	.022	.611	.110	.963	.304	.614	.895	.715	.660	.187	.751	.946	.946
inspire positively appearance	.286	-.046	.339	-.033	.016	-.002	.116	.122	.290	.098	.260	.085	.211	.016	.028	.090
	.013	.694	.003	.781	.890	.987	.321	.298	.012	.404	.025	.469	.069	.894	.814	.445
Opt for friends with knowledge	-.145	-.136	-.108	-.178	.010	.018	-.093	-.164	-.298	-.071	-.085	-.113	-.144	-.191	-.049	-.110
	.202	.231	.343	.117	.932	.873	.414	.149	.008	.535	.454	.321	.207	.092	.668	.334
opt for friends willing to make sacrifices	.085	.014	-.032	.037	.089	-.122	-.258	.040	.020	-.031	.201	.203	.163	.091	-.245	-.101
	.458	.903	.781	.745	.435	.284	.022	.725	.863	.787	.076	.073	.152	.425	.029	.374
Opt for physically attractive friends	.213	.082	.330	.088	.207	.099	.236	.168	.169	.227	.061	-.067	.084	-.106	.147	.136
	.061	.475	.003	.442	.070	.388	.038	.141	.139	.046	.598	.560	.466	.354	.200	.235

In Table 3, being disputable during a discussion is positively related to weakness during it (.293), to practicing verbal aggressiveness in all forms (.367, .300, .593, .269), to respectfulness for mentoring in personal

issues (.281) and scientific attractiveness (.308). Proneness to weakness during a discussion is related to showing respectfulness for mentoring on academic (.218) and personal issues (.271). It is also correlated to verbal aggressiveness (.293, .434, .361) and the tendency to be attracted scientifically (.403), socially (.255) and physically (.249). Proneness to agreement during a discussion is related to respectfulness for mentoring on academic issues (.636) or personal issues (.488) and sympathy (.494), tendency to be attracted scientifically (.506, .248), socially (.387, .334) and physically (.275). There is no correlation to practicing any form of verbal aggressiveness.

Table 3. Relation among network determinants of being an actor of attractiveness, verbal aggressiveness, argumentativeness and power among secondary school students (outdegree)

	Argumentativeness	Power			Verbal aggressiveness				Scientific attractiveness		Social attractiveness		Physical attractiveness	
	Weakness during discussion	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	.393 .000	.027 .803	.281 .008	.030 .783	.367 .000	.300 .005	.539 .000	.269 .012	.200 .063	.308 .004	.162 .135	.126 .246	.230 .032	.165 .127
agreement	.313 .003	.636 .000	.488 .000	.494 .000	.140 .196	.131 .228	.109 .313	-.072 .509	.506 .000	.248 .020	.387 .000	.334 .002	.200 .063	.275 .010
weakness		.218 .042	.271 .011	.263 .014	.293 .006	.434 .000	.361 .001	.174 .106	.403 .000	.113 .298	.255 .017	.132 .223	.185 .086	.249 .020
advice_lessons			.543 .000	.471 .000	.194 .072	.265 .013	.143 .188	-.105 .334	.636 .000	.149 .170	.476 .000	.407 .000	.314 .003	.209 .053
advice_personal				.438 .000	.339 .001	.244 .023	.238 .026	-.152 .160	.597 .000	.248 .021	.324 .002	.375 .000	.288 .007	.446 .000
sympathy					.106 .328	.121 .263	.042 .700	-.194 .072	.436 .000	.104 .339	.492 .000	.439 .000	.405 .000	.332 .002
hurt						.462 .000	.490 .000	.216 .045	.268 .012	.159 .142	.006 .954	.059 .585	.220 .041	.076 .483
irony							.622 .000	.157 .146	.424 .000	.098 .365	.122 .260	.146 .178	.151 .164	.041 .705
rudeness							.276 .010	.302 .005	.184 .088	.058 .594	.125 .249	.168 .120	.179 .098	
help_homework										.366 .000	.511 .000	.403 .000	.223 .038	.138 .202
help_homework_others										.226 .036	.314 .003	.021 .850	.049 .652	
friendly_to_you											.684 .000	.368 .000	.256 .017	
friendly_to_others												.342 .001	.260 .015	
attractive_to_you													.537 .000	

In Table 4, being scientifically attractive makes you socially attractive (.517, .481, .351, .427) and physically attractive (.372). It seems to protect you from being a target of verbal aggressiveness such as hurt (-.230), irony (-.250), rudeness (-.244), threat (-.280), from being a disputer (-.436) or weak during a discussion (-.487, -.309).

On the contrary, being scientifically attractive increases the possibilities of feeling satisfaction due to acceptability during a discussion (.590, .320). Scientific attractiveness is positively related to getting the reputation of a mentor on academic issues (.792, .490), on personal issues (.579, .282) and on sympathy (.542, .321).

Social attraction protects you less than scientific attraction from being a target of verbal aggressiveness. It shows protection only from being a target for rudeness (-.298, .228), but not from other forms like hurt, irony, threat.

It protects from being a disputer (-.424, .371) and weak (-.276, -.239) increases possibilities of feeling acceptability during a discussion (.687, .597). Physical attractiveness encourages receiving verbal aggressiveness in the form of hurt (.234) and does not seem to be protective, it increases acceptability (.457, .476) but protects you from appearing weak during a discussion (-.324, -.332) and allows you to get recognition as mentor (.252, .232, .489, .468) or attract sympathy (.434, .377).

Being a target for verbal aggressiveness is positively related to being a disputer (.420, .430, .452, .275). Finally, acceptability in discussion is incompatible with weakness during a discussion (-.413) but is positively correlated to getting reputation as mentor on lessons (.413), on personal issues (.693) and attracting the liking of others as sympathetic (.711).

Table 4. Relation among network determinants of being a target of attractiveness, verbal aggressiveness, argumentativeness and power among secondary school students (sum= indegree + Katz status + Pagerank + Authority)

	Scientific attractiveness	Social attractiveness		Physical attractiveness		Verbal aggressiveness				Argumentativeness			Power		
	help.home w.others	friendly.you u	friendly.others	attractive to you	Attractive to others	hurt	irony	rudeness	threat	disagreement	agreement	Weakness during discussion	Advice lessons	advice personal	sympathy
Help homework	.546 .000	.517 .000	.481 .000	.372 .000	.267 .012	.093 .393	-.083 .445	-.188 .081	-.280 .009	-.436 .000	.590 .000	-.487 .000	.792 .000	.579 .000	.542 .000
help.homework_others		.351 .001	.427 .000	.196 .069	.082 .448	-.230 .032	-.250 .019	-.244 .023	-.102 .349	-.183 .109	.320 .002	-.309 .004	.490 .000	.282 .008	.321 .002
Friendly to you			.739 .000	.286 .007	.286 .007	-.130 .230	-.138 .203	-.298 .005	-.043 .691	-.424 .000	.687 .000	-.276 .010	.449 .000	.705 .000	.510 .000
friendlyto others				.257 .016	.234 .029	-.136 .210	-.133 .220	-.228 .034	-.125 .250	-.371 .001	.597 .000	-.239 .025	.379 .000	.669 .000	.403 .000
Attractive to you					.732 .000	.234 .029	.161 .137	.129 .232	-.012 .911	-.046 .687	.457 .000	-.324 .002	.252 .019	.489 .000	.434 .000
Attractive to others						.093 .393	.063 .562	-.091 .682	-.176 .401	-.476 .123	.476 .000	-.332 .002	.232 .031	.468 .000	.377 .000
hurt							.567 .000	.680 .142	.159 .000	.420 .826	-.024 .185	.144 .857	-.020 .846	.021 .846	.029 .789
irony								.613 .000	.245 .022	.430 .000	-.132 .224	.242 .024	-.190 .079	-.025 .816	-.054 .617
rudeness									.312 .003	.452 .000	-.206 .056	-.188 .081	-.126 .245	-.161 .136	-.025 .816
threat										.275 .015	-.096 .375	-.151 .164	-.180 .096	-.154 .153	-.060 .580
disagreement											-.468 .000	.278 .014	-.411 .000	-.321 .004	-.397 .000
agreement												-.413 .000	.413 .000	.693 .000	.711 .000
Weakness during discussion													-.437 .000	-.396 .000	-.526 .000
advice.lessons														.424 .000	.399 .000
advice.personal															.510 .000

In Table 5, specific behavioural PCA types are “the interpersonally attractive mentor” and the “physically attractive target”. The first one consists of scientific attractiveness (.786, .517), social attractiveness (.796, .710), physical attractiveness (.452, .492), acceptability (.820) and is recognized as mentor on academic issues (.702), personal issues (.703) and attract others’ sympathy (.679). At the same time, the interpersonally attractive mentor is protected from all forms of verbal aggressiveness like hurt (-.309), irony (-.265), rudeness (-.428), threat (-.289). The second type “The physically attractive target” is recognized to be physically attractive (.566, .498) and at the same time a target for all forms of verbal aggressiveness (.736, .702, .685, .532, .362).

Table 5. Typology of targets of interpersonal attraction, verbal aggressiveness, argumentativeness and power (sum=indegree +katz status +pagerank +authority)

	Interpersonally attractive mentor	Physically attractive target
help.homework	.786	.138
help.homework_others	.517	-.096
Friendly to you	.796	-.029
Friendly to others	.710	-.041
Attractive to you	.452	.566
Attractive to others	.492	.498
hurt	-.309	.736
irony	-.265	.702
rudeness	-.428	.685
threat	-.289	.532
disagreement	-.587	.362
agreement	.820	.145
weakness	-.510	-.165
Advice lessons	.702	.069
Advice personal	.703	.258
Sympathy	.679	.195

In Table 6, specific PCA types are “the socialized troublemaker” and “the lonely coercer”. In the first case, the socialized troublemaker, despite making use of hurting comments (. 518) or ironic ones (. 545), being rude (.468), disputable at times (.433) and weak during a discussion (.656), they never make use of threats (.108), they exhibit proneness to agreement (.585), tendency to be attracted scientifically (.801, .409), socially (.617, .593) and physically (.417) by their classmates and show respectfulness for academic (.772) and personal advice (.753). In the second case, the lonely coercers are disputable (.469) during a discussion, they practice all kinds of verbal aggressiveness such as hurting comments (.556), ironic ones (.418), rude attitude (.597), and they even exercise threat (.511).

Table 6. Typology of actors of verbal aggressiveness, interpersonal attraction, power and argumentativeness (outdegree)

	Socialized troublemaker	Lonely coercer
disagreement	.433	.469
agreement	.585	-.418
weakness	.656	.288
advice_lessons	.772	-.125
advice_personal_	.753	.070
sympathy	.605	-.388
hurt	.518	.556
irony	.545	.418
rudeness	.468	.597
threat	.108	.511
help_homework	.801	-.066
help_homework_others	.409	.121
friendly_to_you	.617	-.404
friendly_to_others	.593	-.409
attractive_to_you	.417	-.312
attractive_to_others	.227	-.414

Discussion and conclusions

Aim of this research was the exploration of interpersonal attractiveness, social power and verbal aggressiveness among secondary school students of physical education. The analysis of these behaviours as structural phenomena was carried out through social network analysis and their determinants were detected.

It is evident that the networks present differences regarding their intensity in the different relations, with the relationships of attractiveness and power being denser than those of verbal aggressiveness. This has been proved in similar studies (Bekiari and Spyropoulou 2016, Bekiari et. al. 2019; Litsa et al., 2021) and indicates that despite emerging detrimental behaviours, physical education classes are still a place of socialization, not of conflict, a place of knowledge and collaboration. Hierarchical forms of attractiveness seem to be correlated in the case of physical, scientific and social attractiveness, which has been also proved (Montoya et al 2008) but do not share any common nodes with the hierarchical forms of verbal aggressiveness. This can be attributed to the fact that verbal aggressiveness is a detrimental form of behaviour that distracts and does not attract, which has been proved in similar studies carried out in physical education university departments (Hasanagas and Bekiari 2015, Bekiari and Hasanagas 2016, Bekiari and Spyropoulou 2016; Spanou et al., 2021). In addition, this finding is in accordance with Brock et al. (2009) who state that status in PE education depends mainly on students' ability, attractiveness and popularity.

Lack of argumentativeness as presented in the hierarchical forms of disagreement during a discussion in a PE class, does not seem to relate in any way with attractiveness hierarchies but only to verbal aggressiveness hierarchies. It appears that lack of argumentativeness may lead to disagreement during a discussion. As Riggio et. (2014) showed communication is a social skill related to the perceptions of attractiveness with the latter being affected by communication skills like fluency and ability to control conversation flow which can affect the overall individual's attractiveness (Riggio et al. 1991). According to Montoya and Horton (2014) communicating creates and sustains interpersonal attractiveness, while Sympas and Bekiari (2015) pointed that argumentativeness has positive relationship with interpersonal attractiveness and negative with verbal aggressiveness for PE students.

Regarding the non-network determinants, gender is an important one. Females are more possibly chosen as mentors either in personal or academic issues and seem to be more scientifically attractive in

comparison to male. This agrees with a study by Brunton (2003) that girls in PE show more preference towards responsibility issues. General grade at school is an indicator for students who are trusted personally or academically and are both scientifically and socially attractive. High general grade is also an indicator for acceptability during a discussion and low general grade is correlated to weakness during a discussion. Good general grade at school appears to be a factor of targeting for verbal aggressiveness and low grade at school seems to be related with practicing verbal aggressiveness. Aiming at future distinction in academic or professional arena is a factor related to gaining others' trust and becoming scientifically attractive as indicated in other studies as well (Krause et al. 2014). Regarding physical characteristics, weight and height seem to relate to attractiveness and verbal aggressiveness. More specifically, being overweight may make students unattractive physically and scientifically, while tall students become targets for verbal aggressiveness as has already been found in Bekiari et al. (2017a). Students living in town are targets for verbal aggressiveness more easily than those living in village. Urban space encourages verbal aggressiveness in comparison to the rural environment (Spanou and Bekiari 2020). Finally, actors of verbal aggressiveness seem to be attracted by appearance and would not opt for friends willing to make sacrifices for them. All forms of attractiveness and their negative relation to verbal aggressiveness were also examined in Sympas and Bekiari (2015).

What typology of table 5 suggests is that being attractive may turn you into a victim of verbal aggressiveness. Physical attractiveness alone does not necessarily protect from being targeted. Physical attractiveness is the most frequently expressed form of interpersonal attractiveness as the content analysis of Bevan et al. (2016) showed, but trusting someone (Singh et al. 2016) has been found to be of greater importance to the emergence of interpersonal attractiveness. This can explain why the mentor profile of our study, that is argumentativeness along with social and scientific attractiveness, protects you from being a target of verbal aggressiveness. Someone who is chosen either as a collaborator due to scientific attractiveness (they may demonstrate knowledge or cooperative skills during sports classes) or as a friend due to social attractiveness (for personal contact and advice), but simultaneously they can support themselves during a discussion, they do not appear to be a target for verbal aggressiveness. Darnis and Lafont (2015) in their study of symmetrical and asymmetrical dyads in PE conclude that knowledge is connected to power in that knowledge allows the support of train of thought and action in sport which equates to power that in turn can support students of lower skills and their results also support our study. Nezlek et al. (2011) found that work consciousness affects interpersonal attractiveness. In our study aiming at excellence and the desire to inspire others are the non-network parameters that affect scientific attractiveness. Someone may be opted as a collaborator during a sports lesson when they aim at the best possible results professionally, academically or they inspire by their attitude in general life or their professionalism. It can also create some different kind of extraversion that is highlighted for interpersonal attractiveness (Losch and Retsch 2018).

The typology in table 6 indicates the role attractiveness can play for the emergence of verbal aggressiveness during PE classes and the degree of its seriousness according to the form of its practice. Students who feel attracted by their classmates physically, socially, scientifically and show respectfulness for academic and personal advice, allowing to be mentored, may practice verbal aggressiveness using hurting comments, irony and rude behaviour but they do not resort to threatening behaviour, which indicates a tendency to act aggressively without being socially excluded. Their aggression seems to be superficial. On the other hand, students who do not feel attracted by their classmates, do not show any respectfulness for being mentored and are considered disputers during discussions, seem to make use of hurting, ironic, rude comments which may turn into threatening behaviour as well. These students manifest idiosyncratic verbal aggressiveness profile and simultaneously seem to be indifferent to school and socialisation. Verbal aggressiveness seems to be part of their idiosyncrasy which self-ostracizes them. Similar results were proposed in Bekiari and Hasanagas (2016), Theoharis and Bekiari (2017), Theoharis et al. (2017).

PE educators, aware of the relationship between attractiveness and power can exploit the socially and task attractive students in order to create intentional tutoring-type situations that can enhance learning and performance in PE classrooms. Also, knowing the profile of aggressive, non-argumentative students can help PE teachers recognize this kind of student, making it easier to attempt their inclusion in PE, since interactions between group members need to be valued in PE classes (Barker and Quennerstedt 2015).

In conclusion, by using network analysis with various centrality values of nodes allowed us to investigate the correlation of network variables of attractiveness and aggressiveness. The analysis shed further light on the network schematic and the differentiations between indicators which reflect a variety of properties and features. Malloy (2018) states that interpersonal attractiveness phenomena operate at multiple levels of analysis and not only on dyad level. Social network analysis really allows us to achieve this multiple level analysis by looking at the network and not just at the dyad. As Finkel et al. (2015) also stated, interpersonal attractiveness varies and is not restricted in dyad relationship and here the combination of conventional and non-conventional statistics facilitates the examination of the multi-faceted phenomenon of interpersonal attractiveness along with social power, argumentativeness and verbal aggressiveness as structural phenomena. Certain limitations of this study consist in the restricted sample as well as in the restricted region. Therefore, the findings reflect the beliefs and knowledge of students in this educational context and geographical area, with the result that there is difficulty in generalizing the results in the wider educational population. However, the

primary aim of this study has not been the generalisation of results to a wider population, but instead to point out how correlations may have a generalised effect and tendency in the PE student community. A challenge of future research would be an extension of sampling on more school classes so as to enable an age-oriented or education level comparison, as well as the use of mixed methods in the exploration of the phenomena.

Conclusions

- Attractiveness and power networks are denser than those of verbal aggressiveness indicating that positive relationships outnumber negative ones in PE classes.
- Lack of argumentativeness is positively related to verbal aggressiveness and negatively related to interpersonal attractiveness. Lack of argumentativeness may turn you both into a target of verbal aggressiveness and into an actor of verbal aggressiveness, a “lonely coercer”.
- Females are chosen more often as mentors and the general grade is an indicator of targeting and practicing verbal aggressiveness, with highly achieving students being targeted by those with lower grades.
- Interpersonally attractive mentors who combine all three types of interpersonal attractiveness, are trusted by their classmates and are argumentative seem to be protected from verbal targeting.
- Not being attracted or mentored by others leads to idiosyncratic verbal aggressiveness development.
- Social network analysis facilitates the visualization of the grid of relationships developed in PE classes.

References

- Alves, H. (2018) Sharing Rare Attitudes Attracts. *Personality and Social Psychology Bulletin*, 1-14. <https://doi.org/10.1177%2F0146167218766861>
- Bekiari, A. (2012) Perceptions of instructor's verbal aggressiveness and physical education students' affective learning. *Perceptual and Motor Skills*, 115(1), 325-335. <https://doi.org/10.2466%2F06.11.16.PMS.115.4.325-335>
- Bekiari, A., Deliligka, S. and Hasanagas, N. (2017) Analysing Networks of Verbal Aggressiveness and Motivation. *Psychology*, 8(3), 495-515. <https://doi.org/10.4236/psyc.2017.83031>
- Bekiari, A., Deliligka, S., Vasilou, A. and Hasanagas, N. (2019a) Socio-educational Determinants of “Bad Behavior” of Students: A Comparative Analysis among Primary, Secondary, and High School. *The International Journal of Learner Diversity and Identities*, 26 (1), 1-19. <http://doi.org/10.18848/2327-0128/CGP/v26i01/1-19>
- Bekiari, A., Deliligka, S., Vasilou, A. and Hasanagas, N. (2019b) Examining pedagogic parameters and verbal aggressiveness through social network analysis: Comparing primary, secondary and high school. *The International Journal of Interdisciplinary Educational Studies*, 15(1), 1-17. <https://doi.org/10.18848/2327-011X/CGP/v15i01/1-17>
- Bekiari, A., Digelidis, N. and Sakellariou, K. (2006a) Perceived verbal aggressiveness of coaches in volleyball and basketball: A preliminary study. *Perceptual and motor skills*, 103(2), 526-530. <https://doi.org/10.2466%2Fpms.103.2.526-530>
- Bekiari, A. and Hasanagas, N. (2016) *Sociological Insights in the Education System: “Unlocking” the Power Relations*. Afoi Kyriakidi Editions SA, Thessaloniki. [in Greek]
- Bekiari, A., Kokaridas, D., and Sakellariou, K. (2005) Verbal aggressiveness of physical education teachers and students' self-reports of behavior. *Psychological Reports*, 96, 493-498. <https://doi.10.2466/pr0.96.2.493-498>
- Bekiari, A., Kokaridas, D. and Sakellariou, K. (2006b) Associations of students' self-reports of their teachers' verbal aggression, intrinsic motivation, and perceptions of reasons for discipline in Greek physical education classes. *Psychological reports*, 98(2), 451-461. <https://doi.org/10.2466%2Fpr0.98.2.451-461>
- Bekiari, A., Patsiaouras, A., Kokaridas, D., and Sakellariou, K. (2006c) Verbal aggressiveness and state anxiety of volleyball players and coaches. *Psychological reports*, 99(2), 630-634. <https://doi.org/10.2466%2Fpr0.99.2.630-634>
- Bekiari, A., Perkos, S. and Gerodimos, V. (2015) Verbal aggression in basketball: perceived coach use and athlete intrinsic and extrinsic motivation. *Journal of Physical Education and Sport*, 15(1), 96 – 102. DOI:10.7752/jpes.2015.01016
- Bekiari, A. and Spyropoulou, S. (2016) Exploration of Verbal Aggressiveness and Interpersonal Attraction through Social Network Analysis: Using University Physical Education Class as an Illustration. *Open Journal of Social Sciences*, 4(06), 145 – 155. <http://dx.doi.org/10.4236/jss.2016.46016>
- Barker D, Quennerstedt M and Annerstedt C (2015) Learning through group work in physical education: A symbolic interactionist approach. *Sport, Education & Society* 20, pp.604–623. <https://doi.org/10.1080/13573322.2014.962493>
- Barker, D. and Quennerstedt, M., (2017) Power and group work in physical education: A Foucauldian perspective. *European Physical Education Review*, 23(3), pp.339-353. DOI: 10.1177/1356336X15620716
- Berscheid, E. and Reis, H. T. (1998) Attraction and close relationships. In D. Gilbert, S. Fiske, G. Linzey, (Eds.), *Handbook of social psychology* (4th ed.) (pp. 193 – 281). New York: Oxford University Press.

- Bevan, J. L., Galvan, J., Villaseñor, J. and Henkin, J. (2016). "You've been on my mind ever since": A content analysis of expressions of interpersonal attraction in Craigslist. org's Missed Connections posts. *Computers in Human Behavior*, 54, pp.18-24. <https://doi.org/10.1016/j.chb.2015.07.050>
- Brunson, J. A., Øverup, C. S. and Mehta, P. D. (2016). A social relations examination of neuroticism and emotional support. *Journal of Research in Personality*, 63, pp.67-71. <https://doi.org/10.1016/j.jrp.2016.05.012>
- Brunton, J.A., (2003) Changing hierarchies of power in physical education using sport education. *European Physical Education Review*, 9(3), pp.267-284. <https://doi.org/10.1177/1356336X030093005>
- Brumbaugh, C. C., Baren, A., and Agishtein, P. (2014). Attraction to attachment insecurity: Flattery, appearance, and status's role in mate preferences. *Personal Relationships*, 21(2), pp.288-308. <https://doi.org/10.1111/perc.12032>
- Brock, S.J., Rovegno, I. and Oliver, K.L., (2009) The influence of student status on student interactions and experiences during a sport education unit. *Physical Education and Sport Pedagogy*, 14(4), pp.355-375. <https://doi.org/10.1080/17408980802400494>
- Cemalcilar, Z., Baruh, L., Kezer, M., Kamiloglu, R. G., and Nigdeli, B. (2018). Role of personality traits in first impressions: An investigation of actual and perceived personality similarity effects on interpersonal attraction across communication modalities. *Journal of Research in Personality*, pp.76, 139-149. <https://doi.org/10.1016/j.jrp.2018.07.009>
- Deliligka, S., Bekiari, A., and Sympas, I. (2017). Verbal aggressiveness and argumentativeness in physical education: Perceptions of teachers and students in qualitative and quantitative exploration. *Psychology*, 8(11), pp.1693 – 1717. <https://doi.org/10.4236/psych.2017.811112>
- Darnis, F. and Lafont, L., (2015) Cooperative learning and dyadic interactions: two modes of knowledge construction in socio-constructivist settings for team-sport teaching. *Physical Education and Sport Pedagogy*, 20(5), pp.459-473. <https://doi.org/10.1080/17408989.2013.803528>
- Deliligka, S., Bekiari, A., and Sympas, I. (2017) Verbal aggressiveness and argumentativeness in physical education: Perceptions of teachers and students in qualitative and quantitative exploration. *Psychology*, 8(11), 1693 – 1717. <https://doi.org/10.4236/psych.2017.811112>
- Finkel, E. J., Norton, M. I., Reis, H. T., Ariely, D., Caprariello, P. A., Eastwick, P. W., ... and Maniaci, M. R. (2015) When does familiarity promote versus undermine interpersonal attraction? A proposed integrative model from erstwhile adversaries. *Perspectives on Psychological Science*, 10(1), pp.3-19. <https://doi.org/10.1177/1745691614561682>
- Guerrero, L. K., & Gross, M. A. (2014) Argumentativeness, avoidance, verbal aggressiveness, and verbal benevolence as predictors of partner perceptions of an individual's conflict style. *Negotiation and Conflict Management Research*, 7(2), pp.99-120. <https://doi.org/10.1111/ncmr.12029>
- Hasanagas, N. and Bekiari, A. (2015) Depicting Determinants and Effects of Intimacy and Verbal Aggressiveness Target through Social Network Analysis. *Sociology Mind*, 5(03), 162. [10.4236/sm.2015.53015](https://doi.org/10.4236/sm.2015.53015)
- Infante, D. A., Rancer, A. S., and Wigley III, C. J. (2011) In defense of the argumentativeness and verbal aggressiveness scales. *Communication Quarterly*, 59(2), pp.145-154. <https://doi.org/10.1080/01463373.2011.563439>
- Kim, K. S. (2018) The effects of interpersonal attraction on service justice. *Journal of Services Marketing*, 32(6), pp.728-738. <https://doi.org/10.1108/JSM-06-2017-0200>
- Krause, S., Back, M. D., Egloff, B., and Schmukle, S. C. (2014) Implicit interpersonal attraction in small groups: Automatically activated evaluations predict actual behavior toward social partners. *Social Psychological and Personality Science*, 5(6), pp.671-679. <https://doi.org/10.1177/1948550613517723>
- Lafont L (2012) Cooperative learning and tutoring in sports and physical activities. In: Dyson B and Casey A(eds) *Cooperative Learning in Physical Education: A Research Based Approach*. London: Routledge, pp.136–149
- Li, C., Brodbeck, F. C., Shenkar, O., Ponzi, L. J., and Fisch, J. H. (2017) Embracing the foreign: Cultural attractiveness and international strategy. *Strategic Management Journal*, 38(4), pp.950-971. <https://doi.org/10.1002/smj.2528>
- Litsa, M., Bekiari, A., & Spanou, K. (2021) Social Network Analysis in Physical Education Classes: Attractiveness of Individuals and Targets of Verbal Aggressiveness. *The International Journal of Interdisciplinary Educational Studies*, 16(1), 151-162. <https://doi.org/10.18848/2327-011X/CGP/v16i01/151-162>
- Lösch, T., & Rentzsch, K. (2018) Linking Personality With Interpersonal Perception in the Classroom: Distinct Associations With the Social and Academic Sides of Popularity. *Journal of Research in Personality*, 75, pp.83-93. <https://doi.org/10.1016/j.jrp.2018.06.003>
- Malloy, T. E. (2018) Interpersonal attraction in dyads and groups: Effects of the hearts of the beholder and the beheld. *European journal of social psychology*, 48(3), pp.285-302. <https://doi.org/10.1002/ejsp.2324>

- Martin, M. M., and Anderson, C. M. (1996) Argumentativeness and verbal aggressiveness. *Journal of Social Behavior and Personality*, 11(3), pp.547. <https://search.proquest.com/docview/1292308579?accountid=164385>
- Matey, J. (2016) Good looking. *Philosophical Issues*, 26 (1), pp. 297-313. [10.1111/phis.12083](https://doi.org/10.1111/phis.12083)
- McCroskey, J. C., and McCain, T. A. (1974) The measurement of interpersonal attraction. *Speech Monograph*, 41 (3), pp.261-266. <https://doi.org/10.1080/03637757409375845>
- Montoya, R. M., and Horton, R. S. (2014) A two-dimensional model for the study of interpersonal attraction. *Personality and Social Psychology Review*, 18(1), pp.59-86. <https://doi.org/10.1177%2F1088868313501887>
- Montoya, R. M., Horton, R. S. and Kirchner, J. (2008) Is actual similarity necessary for attraction? A meta-analysis of actual and perceived similarity. *Journal of Social and Personal Relationships*, 25(6), pp.889-922. <https://doi.org/10.1177%2F0265407508096700>
- Mumford, E. A., Taylor, B. G., Berg, M., Liu, W., and Miesfeld, N. (2019) The social anatomy of adverse childhood experiences and aggression in a representative sample of young adults in the US. *Child abuse & neglect*, 88, pp.15-27. <https://doi.org/10.1016/j.chiabu.2018.10.016>
- Nezlek, J. B., Schütz, A., Schröder-Abé, M., and Smith, C. V. (2011) A cross-cultural study of relationships between daily social interaction and the five-factor model of personality. *Journal of Personality*, 79(4), pp.811–840. <https://doi.org/10.1111/j.1467-6494.2011.00706.x>
- Popitz, H. (1992). *Phänomene der macht*. Mohr Siebeck.
- Popovych, I., Kurova, A., Koval, I., Kazibekova, V., Maksymov, M., & Huzar, V. (2022) Interdependence of emotionality, anxiety, aggressiveness and subjective control in handball referees before the beginning of a game: a comparative analysis. *Journal of Physical Education and Sport*, 22(3), 680-689. DOI:10.7752/jpes.2022.03085
- Riggio, R. E., Widaman, K. F., Tucker, J. S., and Salinas, C. (1991) Beauty is more than skin deep: Components of attractiveness. *Basic and applied social psychology*, 12(4), pp.423-439. https://doi.org/10.1207/s15324834basp1204_4
- Riggio, H. R., Lui, P. P., Garcia, A. L., Matthies, B. K., Culbert, G., and Bailey, J. (2015) Initial validation of a self-report measure of perceptions of interpersonal attraction. *Personality and Individual Differences*, 74, 292-296. <https://doi.org/10.1016/j.paid.2014.10.030>
- Rodrigues, D., Lopes, D., Alexopoulos, T., and Goldenberg, L. (2017) A new look at online attraction: Unilateral initial attraction and the pivotal role of perceived similarity. *Computers in Human Behavior*, 74, pp.16-25. <https://doi.org/10.1016/j.chb.2017.04.009>
- Selfhout, M., Burk, W., Branje, S., Denissen, J. J. A., van Aken, M., and Meeus, W. (2010) Emerging late adolescent friendship networks and Big Five personality traits: A social network approach. *Journal of Personality*, 78(2), pp.509–538. <https://doi.org/10.1111/j.1467-6494.2010.00625.x>.
- Siedentop, D. (1994) *Sport Education: Quality PE through Positive Sport Experiences*. Champaign, IL: Human Kinetics.
- Singh, R., Jen Ho, L., Tan, H. L., and Bell, P. A. (2007) Attitudes, personal evaluations, cognitive evaluation and interpersonal attraction: On the direct, indirect and reverse-causal effects. *British Journal of Social Psychology*, 46(1), pp.19-42. <https://doi.org/10.1348/014466606X104417>
- Sortheix, F. M. & Lönnqvist, J. E. (2015) Person-group value congruence and subjective well-being in students from Argentina, Bulgaria and Finland: The role of interpersonal relationships. *Journal of Community & Applied Social Psychology*, 25(1), pp.34-48. <https://doi.org/10.1002/casp.2193>
- Spanou, K. & Bekiari, A. (2020) Analyzing Social Networks of Destructive Behaviours in Universities *International Journal of Sociology of Education*, 9(1), 60-92. <https://dx.doi.org/10.17583/riase.2020.4642>
- Spanou, K., Bekiari, A., & Litsa, M. (2021) Unveiling Negative Behaviors in the Academic Arena. *The International Journal of Interdisciplinary Educational Studies*, 15(2), 29-43. <https://doi.org/10.18848/2327-011X/CGP/v15i02/29-43>
- Syrmpas, I., and Bekiari, A. (2015) The Relationship between Perceived Physical Education Teacher’s Verbal Aggressiveness and Argumentativeness with Students’ Interpersonal Attraction. *Inquiries in Sport & Physical Education*, 13(2).
- Syrmpas, I., & Bekiari, A. (2018) Differences between leadership style and verbal aggressiveness profile of coaches and the satisfaction and goal orientation of young athletes. *Journal of Physical Education and Sport*, 18(2), 1008-1015. <https://dx.doi.org/10.7752/jpes.2018.s2149>
- Talley, L. and Temple, S. (2015). How leaders influence followers through the use of nonverbal communication. *Leadership & Organization Development Journal*. <https://doi.org/10.1108/LODJ-07-2013-0107>
- Teymoori, A. (2020) Heinrich Popitz, Phenomena of Power: Authority, Domination, and Violence. *International Sociology Reviews*, 35(2), pp.170–177. DOI: 10.1177/0268580920906705
- Theocharis, D. and Bekiari, A. (2017) Applying Social Network Indicators in the Analysis of Verbal Aggressiveness at the School. *Journal of Computer and Communications*, 5(07), 169 – 181. <https://doi.org/10.4236/jcc.2017.57015>

- Theocharis, D., Bekiari, A. and Koustelios, A. (2017) Exploration of Determinants of Verbal Aggressiveness and Leadership through Network Analysis and Conventional Statistics. Using School Class as an Illustration. *Sociology Mind*, 7(02), 27 – 43. <https://doi.org/10.4236/sm.2017.72003>
- Van der Linden, D., Scholte, R. H. J., Cillessen, A. H. N., te Nijenhuis, J., and Segers, E. (2010) Classroom ratings of likeability and popularity are related to the Big Five and the general factor of personality. *Journal of Research in Personality*, 44(5), pp.669–672. <https://doi.org/10.1016/j.jrp.2010.08.007>
- Ward P. and Lee M. (2005) Peer-assisted learning in physical education: A review of theory and research. *Journal of Teaching in Physical Education* 24: pp.205–225. <https://doi.org/10.1123/jtpe.24.3.205>
- Wrzus, C., and Mehl, M. R. (2015). Lab and/or field? Measuring personality processes and their social consequences. *European Journal of Personality*, 29(2), 250-271. <https://doi.org/10.1002/per.1986>.
- Zhao, Z., Salesse, R. N., Gueugnon, M., Schmidt, R. C., Marin, L., and Bardy, B. G. (2015). Moving attractive virtual agent improves interpersonal coordination stability. *Human movement science*, 41, 240-254. <https://doi.org/10.1016/j.humov.2015.03.012>