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**Channeling Friendships across Social Types via
Mediated Communication and High School Clubs**

by

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A dissertation
Submitted in partial fulfillment of the
Requirements for the degree of

Doctor of Philosophy

University of Washington

2013

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The Information School

University of Washington

Abstract

Channeling Friendships across Social Types
via Mediated Communication and High School Clubs

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This dissertation is about how common contexts for extracurricular activities, friendships, and technology mediated interactions form social structures that are related to distinct civic experiences of high school youth from diverse social types. A key role of education is to prepare individuals to participate in civil society. Extracurricular and civic experiences during high school contribute to such preparation because they are associated to civic participation in adulthood. Yet, participation opportunities for students are unequal. Research suggests that adolescents of diverse social types (i.e., categorical labels based on behavior stereotypes that students place on each other, like “Jocks” or “Gamers”) are predisposed to different activities. Extracurricular participation is further constrained by concerns for social validation (e.g., underperforming to not be labeled “Nerd”). Today, such social processes are increasingly mediated by communication technologies and social media.

Despite the importance of social types, extracurricular activities or school clubs, friendships, and technologies in adolescents’ social development, little is known about their synergistic influences, the social structures they create, and how such structures affect civic experiences. In this dissertation, I compare such phenomena across two high schools. Based on 315 surveys, 26 interviews and observations collected over 10 months, I found that there are potentially optimal social structures for adolescents’ development of civic experiences; that the existence of multiple domain-specific school clubs, particularly in Science Technology Engineering and Math

(STEM) and community service, was critical to the distinct social structures observed in each school; and that when the social structures were based on mediated interactions via different technologies (e.g., texting, instant messaging), specific affordances were revealed, about technologies and activity contexts, that helped make sense of how sub-communities select a communication technology to maintain needed group boundaries while use others to remain connected to their broader community.

Using established methods in social network analysis, I examine the common contexts shared by social types. Adopting an information perspective, I describe how social information, such as values and norms, is channeled across social types via their common contexts of shared friendships or school clubs. I also assess the potential for such channels to bridge social divisions. Observed social structures corroborated students' perceptions of social divisions, and the desire (or lack thereof) by social types from each school to participate in civic activities.

I conclude first, with implications for schools to plan for broader civic participation according to the observed social structures. Then, I address the need for researchers to use social interaction data from more than one technology medium to make conclusions about social structure. Finally, I discuss design opportunities and challenges for supporting sub-communities' needs to reify their group boundaries through a preferred technology while maintaining some connection to other groups. These implications for schools, research methods, and technology design, speak to the major concerns in information science: on the development of STEM and civics as part of life-long learning, on assessing research methods to study the vast availability of online data, and on novel design directions.

DEDICATION

I dedicate this dissertation to Ed and Aiden.

With you, any journey is possible and much more enjoyable.

ACKNOWLEDGEMENTS

This dissertation was partially funded by a 2009 NSF dissertation improvement grant from the Sociology Program (award # SES-0927291), a 2012 University of Washington Graduate School Presidential Fellowship, and a seed doctoral research grant from the Information School.

I would like to thank Mike Eisenberg, Chair of my committee, for his continuous support. He has been a constant positive energy supplier. Without him, I would not have been able to gain access to the high schools from which I collected data. Mike also helped me get Microsoft Zunes for a student raffle, and supported my progress morally and financially. Thanks also to David W. McDonald and Kate Stovel for their advice, for asking hard questions, and helping me frame my research for specific communities. Thanks David for pushing me to move beyond “ICTs” thinking, for helping me frame my work for the CSCW community, and for helping me make my design implications more approachable to technology designers. Thanks to Kate for her feedback on my NSF dissertation proposal, without which I would not have won my NSF dissertation award. Kate also introduced me to seminal work on network thinking, upon which much of my work is grounded, and suggested various data analysis methods. Thanks to Lynne Manzo, my GSR, for her detailed proofreading of my written dissertation. Thanks to Ricardo Gomez, internal reader, for willing to join my committee in the last couple of months, and for his thoughtful questions. Reducing my committee members’ contributions to such few words is unfair and insufficient, but I hope it conveys a bit of my gratitude towards them.

Thanks to the School District, teachers, staff, and students (and their parents) for participating in my dissertation. I am not naming them all to protect students’ privacy, as agreed in the Human Subjects application.

This dissertation has also received advice or assistance from other individuals and departments at the University of Washington, including Marine Bahnsen, with assistance in R-coding; Hil Lyons from the Center for Statistical Consulting (CSC),

Department of Statistics; and Stephanie Lee and her colleagues at the Center for Social Science Computation and Research (CSSCR).

This dissertation has also benefited from teachings and/or advice from various individuals outside the University of Washington. I participated in the LINKS 2010 Center Summer Workshop on Social Network Analysis, housed in the Gatton College of Business and Economics at the University of Kentucky. There, Dan Halgin, Rich DeJordy Steve Borgatti and his team of Teaching Assistants, including Virginia Kidwell provided teachings and advice. Thanks to Steve Borgatti specifically for responding quickly to my UCINET bug reports and questions, along with Martin Everett. Thanks also to members of the INSNA listserv who responded to many of my inquiries. What a great community of smart scholars! Thanks to Ronald E. Rice and Hyo Kim for answering my questions about the methods they used in their paper *Journal of Computer-Mediated Communication* paper "Configurations of Relationships in Different Media: FtF, Email, Instant Messenger, Mobile Phone, and SMS," which I was very happy to have found during the time I was analyzing my data.

During the time I was developing my dissertation proposal, I also benefitted from wonderful discussions, albeit brief and via email, with various researchers. Molly W. Andolina, Professor in Political Science at DePaul University, and Cliff Zukin, Professor of Public Policy and Political Science at Rutgers' Edward J. Bloustein School of Planning and Policy, discussed conceptualizations of civic engagement with me. Roberta Garner, Professor in Sociology at DePaul University shared her survey on adolescent cultures with me. Although my research did not draw on such survey, I thank her for her willingness to share. B. Bradford Brown referred me to relevant articles and answered questions via email about his STR (Social Type Rating manual), which although I did not adopt fully, when developing my survey, I consulted and used many of the social types in the STR.

Work-in-progress from this dissertation has also been presented at various doctoral consortia, including CSCW '11, iConference '10, and CHI '09. Although the dissertation might not have gone in the directions discussed in these consortia, the

exposure was nevertheless a valuable part of the process. Thanks to the advisors at such doctoral consortia.

My PhD student peers have also been tremendous supporters at all stages of my dissertation. Thanks to my proposal writing support group (Oknam Park, Sunny Consolvo, and Phil Edwards), and peers who have at one point or another discussed any aspect of my data analysis or provided any other feedback (Ammy Jiranida Phuwarnartnurak, Gifford Cheung, Parmit Chilana, Jeff Hemsley, Jeff Huang, Shaun Kane, Shawn Walker, and others, who I may have left out for my aging memory). I also thank my former committee members Jens Eric Mai and Batya Friedman. I am sure one way or another, they have influenced my thinking.

Thanks also to former and current staff at the iSchool from finance (Ty Ngo, Chanthala, and Dora), HR (Alisha, Crystal), research, and IT (Joshua Ayson, Scott Barker, Andy Gravano, Martin Criminale and all the students who worked there) for all their support.

Finally, but most importantly, this dissertation would certainly not have been possible without the love and support from my husband, Edward Roberts, who has had to single parent and act as the primary home-maker more often than not. He has helped my four year old son understand why mommy is not around for dinner or over the weekend. I am grateful and touched by his dedication, patience, and love. I also thank my son, for understanding at an early age, to play quietly by mommy's side while she works, and for thinking about mom's need to work even as he fantasizes going to a park in Cupertino. I love you both.

FOREWORD

I take advantage of the dissertation format to share my reflections on the processes that affected the outcome of the research design, methodology, sampling, data collection, and analysis. I strongly believe it is important that I share such reflections in this dissertation to genuinely report how things came about. Thus, the reader should be prepared to find some sections to have a reflective rhetoric, and others more standard rhetoric.

Having established the importance I place on sharing my reflections, I next write about personal experiences which may have contributed to shaping this dissertation. Although I did not do high school in the US¹ (United States of America), I observed similar concerns from my classmates in my “secundaria²” (in San José, Costa Rica) to those in U.S. high schools, of gaining popularity via sports, cheerleading, and social wit, and depreciating status by not participating successfully in the school's social life. At the same time, I also received the greatest³ civic education: it raised my awareness towards the importance of civic and political engagement to sustain a democratic society. Yet, for me, none of such awareness translated into actions at the time. I am certain that many factors contributed to such unsuccessful translation. However, I also know that I felt I was not the “right” person to contribute to community causes or to lead others. I knew what others perceived me as: Asian, with outstanding academic record, math whiz, musically talented (which just means I played the piano). Though these sound like a lot of characteristics, in a school with only a handful of Asians, the other characteristics used were “naturally” a part of the Asian stereotype that people had (which I learned from comments like, “you are not like other Asians,”

¹ Though “America” is commonly used in colloquial speech to refer to the US, I am personally against such use. America is the whole continent, and saying America to refer specifically to the United States of America shows a degree of US-centrism with which I take issue. I apologize to those who I offend by expressing such view.

² “Secundaria,” in Costa Rica and many countries in Central America, is the equivalent of high school in the U.S.

³ Which I can only compare with the little to null exposure to civics education in Taiwan, and in comparison to my sisters who went to different high schools than I did (one went to an U.S. high school in Costa Rica, which followed an international baccalaureate curriculum, and the other one went to a high school in Guatemala).

or “wow, you opened up today.”) Notice the lack of any social characteristics in the stereotype, and if any were added by my peers at the time, they would likely be along the lines of being quiet and reserved.

I stopped grappling with my socio-cultural identity in my mid-twenties, which I understand in relation to the amount of international mobility I have had⁴. However, one thing continued to concern me: the lack of broader civic participation, including my own. I feel that as members of this world, everyone who has his/her basic survival needs met ought to contribute some time to serve their communities because it is such contributions that sustain the functioning of our society at large.

Given my experiences and the gaps I found in the literature, when I set an interest in civic participation in my PhD program, I could not overlook the social structures that shape people’s civic actions—social structures which are related to that sense of whether we are the right person to lead a community or civic act. In fact, the social structures and sense of self outgrew the focus on civic participation. As a diligent doctoral student, I read and read. I learned that civic engagement during the teenage period is a predictor of that in adulthood. I opened my perspective of civic engagement in high school to include involvement in any extracurricular activity, as these are settings that shape teens’ social and civic selves. I learned about the potentially devastating effect of *social crowds*, the academic technical term to refer to categories like Gamers and Partyers in high schools, which I substitute with *social types*. I read about students underperforming to not be labeled Nerd. I found a gap between the literature of social crowds and type of activity involvement—what exists only accounts for five social types based on a movie and does not find a connection between social types and diverse activities, except for sports and cheerleading (what exists is also old and does not look at newer technologies or no technologies at all).

I hope this provides you, the reader, with some background on why I am so passionate about my dissertation, and why I am the perfect familiar-stranger to

⁴ I moved to Guatemala when I was 2; to Taiwan at age 8; to Costa Rica at age 10; Taiwan again at age 18; and the US at age 25.

conduct this research: optimally familiar and foreign to the subject matter. While not reporting ethnographic research, the phrase balancing “empathic involvement and disciplined detachment” (Mead, 1973, p. 248) describes my position.

My aim is not to reinforce the stereotypes associated with social categories, but to uncover social structures which perpetuate the constraints and opportunities associated with each social type category, and suggest strategies that may break such constraints.

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Chapter 1. Introduction

I introduce my dissertation with the narratives of Tad and Phil⁵, respectively seniors from Prosperous High and Rising High—the two U.S. high school settings in my dissertation research.

“Some of the sports people and the really socially active people don’t like our sort of group, the Internet group,” shared Tad when I asked whether there were social types in school that did not mix well. He continued: “Last year, when I was running for Vice President... there were quite a few people that came up to me and said: ‘There’s no way you’re gonna win.’” It turns out, Tad did win the election. May, also a senior at Prosperous, seemed surprised by the stardom Tad and his friends had gained: “For whatever reason, a bunch of really nerdy kids have gotten stardom, like Tad. Everyone thinks he’s fantastic because he’s a video whiz. He just puts things together.” Tad develops computer games, and as the student Vice President, Tad is active in school leadership activities and participates in school clubs and events. In fact, this ambience of confidence, leadership, and social engagement characterized the tech-savvy teens at Prosperous High, labeled by non-Nerds as “Nerdy.” They took pride in how they used communication technologies and social media with friends and online communities. Such technology practices were part of a social identity they co-developed in school, vis-à-vis other non-techy peers.

The same could not be said for the tech-savvy teens at Rising High. When explaining what “Nerd” meant, a label Phil knew others placed on him, he said: “But I don’t think of a Nerd as something low as what people see me as.” He was certain of the low perception others had of him: “I know that for a fact... Like my first period class, no one will talk to me... I’m the only one who has the assumed image of a Nerd, I guess.” Phil was once part of a short-lived student-initiated video gaming club, which did not retain enough regular “true gamers.” Since then, Phil had not been involved in other school clubs. His interaction with peers at school with similar interests took place

⁵ Pseudonyms are used for the study participants and high schools.

primarily at the library during lunch periods, face-to-face. Thus, although he also used communication technologies and social media with peers, such usage, as part of his identity, was not co-developed with peers through common school-based activities vis-à-vis non-techy peers.

Both Tad and Phil are seen, and see themselves, as “nerds” and “geeky.” Neither is highly athletic, but both are very savvy about computer technologies. However, both had different social experiences. In both schools, social divisions between social types existed. However, in one school social types exhibited a *clusters structure*, in which social types in a cluster are more densely interconnected to each other than to social types outside a cluster. In the other school social types had a *center-periphery structure*, with social types at the center being more densely interconnected to each other than social types at the periphery. Which social structure is associated to Tad and which to Phil’s social experiences in school? In what school clubs and activities do teens like Tad in his school engage in (or show interest) that teens like Phil in his school do not? Did other students in Tad and Phil’s school seek out leadership opportunities, or retrieve and show no interest? Do any teens simultaneously have close friendships with both Nerds and Populars in Tad or Phil’s school? Further, in the school with the clusters structure, some clusters persisted when the basis for the social structures was the mediated communication across social types via specific technologies. What could be a logical explanation for such socio-technical phenomena? And, what else may account for the different experiences of Tad and Phil?

This dissertation is motivated by these types of questions; the socio-technical structures associated to the differences that teens like Tad and Phil experienced in their social development in high school (i.e., the formation of social, leadership, and civic identities, determining what activities to participate in, and befriending peers); and the role of technologies like texting, instant message, and social network sites in mediating teens’ friendships amidst such socio-technical structures (see Figure 1-1).

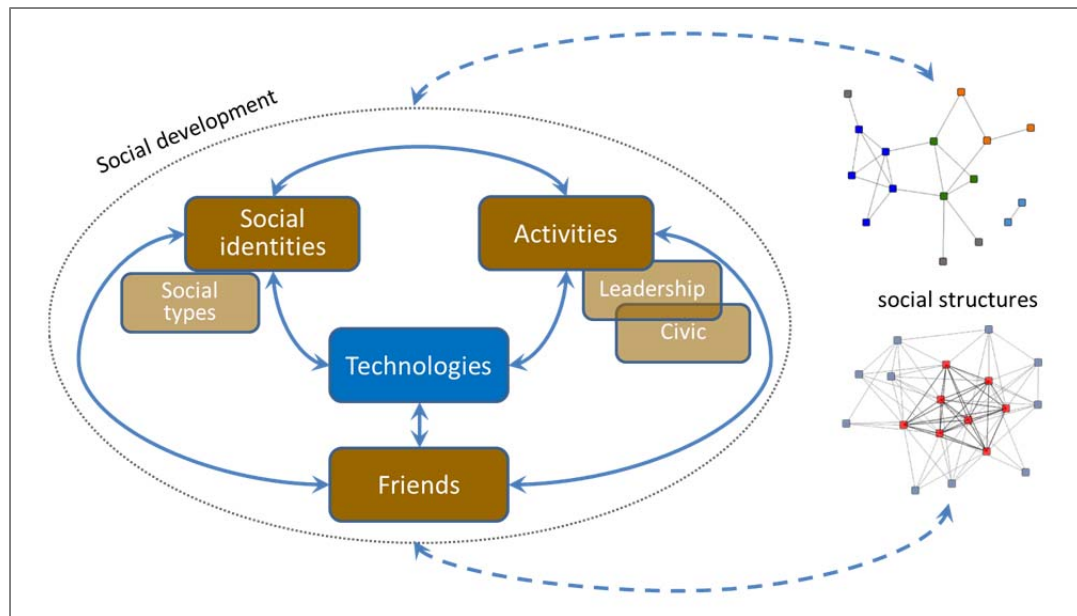


Figure 1-1. Synergistic influences of diverse factors in adolescents' social development.

The overarching research question is: **How do social identities, extracurricular activity involvement, and technology mediated and unmediated social networks create synergistic influences to shape adolescents' social development?**

Social identities are developed through relationships between groups and social categories (Tafjel, 2010). In high schools when teens are sensitive to social judgment (Muss, 1996), the effect of socially constructed categories (or *social types* like “Jocks” or “Nerds”) may be more pronounced, and has been known to affect teens’ sense of selves and performance in school (Brown & Steinberg, 1990). Social types are also potentially related to involvement in *extracurricular activities* (i.e., school clubs) and friendships (Eccles, Barber, Stone & Hunt, 2003), both of which are crucial to teens’ long-term learning and responsible participation in civic society, as I explain next.

Firstly, since extracurricular activities are not required by school curricula, they are more likely to enable the building of lasting social and personal supports (Barron, 2006). Secondly, having supporting social relationships in the activity ensures continued engagement in that activity (Lin & Farnham, 2013; Ryan & Deci, 2000).

Thirdly, continued interest in activities can shape professional paths (Beal & Crockett, 2010). Fourthly, in terms of broader societal impact, those who participate civically via extracurricular activities like the student government, leadership and service are more likely to be civically engaged as adults (Hanks, 1981; Youniss, McLellan & Yates, 1997; Verba, Schlozman & Brady, 1995).

Less well known is how diverse forms of *mediated communication* via technologies (like texting, instant message, and social network sites) contribute to our understanding of how social types and friendships shape teens' social development. As identities are developed relationally (Tafjel, 2010), and teens are amongst the most heavy users of social media and technologies with friends (Lenhart, Madden, Smith & MacGill, 2009), my dissertation contributes by integrating technologies into the in-depth study of social types and the aforementioned synergistic influences (between social identities, social networks and extracurricular activities). Further, given the broader societal impacts of civic and leadership types of extracurricular activities, I place particular attention on the student government and the Leadership⁶ class (which acts like a club where the student government and other student representatives meet to carry their duties).

I place particular attention to the Leadership class because underlying this examination of social types and school clubs is my interest in examining whether opportunities to be involved in leadership/civics types of activities are equal for diverse adolescents. We know from literature, that the answer is “no.” McNeal (1998) shows that participation in extracurricular activities is systematically selective, with those of higher socio-economic status (SES) and higher academic records enjoying a distinct advantage. McNeal states that many factors contribute to such systematic bias, including teachers' preference, differential recruitment, and sponsorship; the membership capacity in each club, students' prior experience, gender, race, and socio-economic status. Thus that extracurricular activities are discretionary electives is actually a misconception. Students' “voluntary” choices are more restrictive than we

⁶ Hereafter, whenever referring to the Leadership class, the term “Leadership” will be capitalized. Whenever referring to the concept of leadership, the term will not be capitalized.

may think. McNeal's study gets at the essence of inequality in which I am interested. However, McNeal does not examine whether a systematic bias in selection exists based on social types. According to Brown (1990), social class also figures heavily in affiliation in certain social type categories, especially in higher-status categories amongst girls (p. 184). From such literature, we can guess that a systematic selection bias on extracurricular participation by social type also exists. However, to my knowledge, very few empirical studies examine such systematic bias. My study fills in such gap.

In Prosperous High (Tad's school), I conducted 137 surveys, and 13 interviews, and in Rising High (Phil's school) 178 surveys, and 13 interviews. I conducted observations over 10 months in both schools, which are set in the Pacific Northwest in the US. I treat each school as a distinct setting in which different socio-technical ecologies were observed and reflected in a set of students' experiences. My perspective is ecological—that multiple forces influence each other and one does not determine the other by itself. Thus, my aim is descriptive and not deterministic. Through logical inference (Small, 2009), I assess the internal conditions that shape my propositions about the socio-technical ecologies. To validate what local forces exist in such ecologies, I compare the following research questions across both schools:

- 1) How are social types related to school clubs in terms of students' perceptions of social types' involvement in school clubs?
 - a. Are the perceived opportunities for participation in school clubs equal?
 - b. Based on this perception, how do school clubs channel social types?

That is, two social types may be perceived to be active in similar sets of school clubs. Thus, these school clubs channel⁷ or bridge the

⁷ Note that I reserve the term "mediated" to refer to technology-mediated communication/interactions, and "channeling" for the bridging enabled by the overlaps between social types.

exposure that these social types have of each other's values, norms, and practices.

- 2) How are social types structured based on common friendships (i.e., overlaps) between social types?

In other words, two social types overlap based on the respondents who have friends in both social types. These respondents are the common friendships between the social types, and act as the channels for values, norms, and practices between the social types. So, the question asks how social types overlap based on these common friendships in these *common friendship networks*?

- 3) To what extent does *mediated channeling* (i.e., technology-mediated channeling) of friends across social types replicate the social structure of social types—the unmediated channeling (obtained in 2)?

This involves examining first, the social structure of social types based on common technology-mediated interactions per each of seven technologies (email, instant messaging, texting, mobile phone, social network sites, twitter, and virtual worlds). Here, the overlap between social types represents not only the respondents who have friends in the same pair of social types, but who also interact at above a minimum level of interaction common to both social types. These *common technology interaction networks* are correlated to the common friendship networks in research question 2 to assess the similarity between them.

- 4) What additional insights do observations and interviews provide about how the socio-technical ecology in these schools contributes to or constrains students' social development?

- a. Are aggregate perceptions of social types in school related to students' self-imposed norms of participation in school clubs?

- b. How does the resource availability for school clubs affect student opportunities and participation in them?

These are important questions. Developmentally, teens are not only forming activity interests and life-long learning patterns (Muuss, 1996a, p. 51), they are also highly concerned with social judgment to the extent of underperforming to not be labeled or categorized into undesirable social types in school (Brown & Steinberg, 1990). In other words, teens are at the same time, in the need of carving their own interests and senses of selves, and of behaving in ways that gain social validation. These needs can be in conflict with each other if teens' interests do not receive social support and status validation. Thus, understanding the ecologies that support teens' involvement in diverse school clubs or extracurricular activities can help design ways to support the balance between the aforementioned needs. This is particularly important since the teens affected by such eco-systems have very little power to affect the broader systems which determine financially and structurally how teens' social development will be supported.

The connection between social type identification through peers, activity involvement, and the pathway of teens' experiences in high school, has been suggested in prior research (see Eccles et al. 2003 p. 873 for a thorough review). To this body of work, I contribute the examination of social types and school clubs based on a broader range of social types that are more current. I include in my study STEM (Science, Technology, Engineering, and Math) related clubs like the Robotics, Science Olympiad, and Gaming, and social types interested in these clubs, like Internet and Gamer. STEM types of clubs and social types have not received much attention in studies of adolescent development, and studies focusing on the development of STEM skills have not paid attention to high school social types. Further I distinguish the involvement in the student government/Leadership class from other service types of activities because the Leadership class, as the quintessential form of civic participation in high school, receives school-wide attention. The addition of the Leadership class and STEM clubs raise our awareness towards norms and values that differ across social types, and the

role that Leadership and STEM clubs play in adolescents' development and in a school's overall ecology.

How teens use technologies has also been of interest to diverse researchers. For example, some have examined friendships, "context collapse,"⁸ and identity performance in social media (boyd, 2004; 2006; 2007, 2009); instant messaging use for socializing, collaboration, and issues surrounding peer pressure and privacy management around the technology (Grinter & Palen, 2002), gaming and other social media use as different genres of participation, sociability, and identification in different communities (e.g., Ito et al., 2010); issues surrounding contribution, re-use, and attribution in the creative production of content (Monroy-Hernández, Hill, González-Rivero & boyd, 2011); the formation of media production identities (Lange & Ito, 2010); and the role of technologies in informal learning (Greenhow & Robelia, 2009; Lin & Farnham, 2013). Although identity is a component in many of these studies, most treat teens as one large category, or identify subgroups based on interests, socio-economic status, technology access and practices. However, these studies do not examine identities in terms of social type labels or common school club contexts, or how technology-mediated communication with friends in these contexts further understandings about how: (a) social types are structured based on commonalities; (b) technology practices play a role in teens' identities, friendships, and extracurricular activities; (c) socio-technical affordances both, enable mediated communication patterns, and reinforce socio-technical identities; and (d) to balance delineating categorical boundaries while channeling social information between them.

By describing identities in terms of social type commonalities through overlapping friendships or school clubs, and the role of technology mediated communication in these contexts, I convey the ease with which students can transition across social types for social support (this is the "channeling" that common contexts enable), why students feel they don't fit in or do not participate in leadership/civic

⁸ Context collapse is used by boyd (2009) to refer to how the natural boundaries of an individual's social circles fall apart in online social media, like Facebook, where friends from different social circles gain access to each other's social contexts.

activities, how common activity contexts afford technology-mediated communication with friends, and the role of school clubs and technology-mediated practices in reinforcing social structures and socio-technical identities.

For example, based on teens' perceptions of school clubs, I map out which social types are connected to leadership opportunities via school clubs, and how school clubs interconnect or channel social types (i.e., how social types overlap based on their engagement in the same school clubs) (Chapter 8). Further, to the extent that teens' peers define teens' social identities, I employ social network analysis methods to examine the overlap between peers' social types, or how social types are structured or interconnected via common friendships (Chapter 9). Such an approach has not been used to study teens' social types, and reveals: (a) the channeling role that different social types have, (b) the extent of intermingling across social types; and (c) whether the social type overlaps based on students' perception of social type involvement in school clubs matches social type overlaps based on common friendships. The overlap between social types helps to interpret the reinforcement of values and norms vs. contradiction and social division (Chapter 7). I also examine how the overlaps between social types differ if examined in terms of teens' mediated communication via texting, instant messaging, or social network sites; how social identities and social type relationships are channeled and reinforced by these technologies; and what the patterns observed reveal about socio-technical affordances (Chapter 10).

I use thick descriptive analysis to create logical inferences⁹ (Small, 2009, p.22) on how diverse forces in this study are interdependent. Thus, throughout the chapters, I draw on interviews and observations to my enrich understandings of the socio-technical ecologies in each school.

The rest of the chapters not referenced above are structured as follows. In Part I, I review the literature of adolescent peer cultures and why it is important to frame peer cultures in terms of overlapping microsystems (Chapter 2). I also introduce the conceptual foundations on which my methods are based, including the "Duality of

⁹ Logical inferences as opposed to statistical inferences.

Persons and Groups” (Breiger, 1974), and “Social Space” (Sorokin, 1927). In Part II, I justify the use of mixed methods, and present my own mixed methods model (Chapter 4). Then, I describe the research design for my study, the level of abstraction and data analysis for each research question (Chapter 5). I also describe the two high schools where I collected data, how their culture and management affected parent permission and student survey response rates, data collection instruments, sampling, the type of data collected, the social types that teachers said existed in their schools, and the ones I finally used in the student survey (Chapter 5). In Part III, I describe how respondents’ social types differed across both schools (Chapter 6); why social types mattered, the social divisions that existed, and which social types were perceived to be central by students (Chapter 7). In Part III, I also present the rest of the findings, as described previously (see references for Chapter 8, 9, and 10 above).

In Part IV, the conclusion (Chapter 11), I summarize my findings, and offer pragmatic strategies that educational institutions may use to provide more equitable educational and extracurricular experiences for diverse youth. For example, I discuss how school can plan for broader civic participation according to observed social structures, or offer diverse domain-specific school clubs, including those in STEM to support the development of shared activities, identities, and thus a civic presence in school. I also suggest how to measure student learning ecologically. Then, because technology mediated interactions via diverse technologies resulted in distinct social structures, I address the need for researchers to use social interaction data from more than one technology medium to make conclusions about social structure. Finally, as I found that sub-communities select a communication technology to maintain needed group boundaries while use others to remain connected to larger networks, I address a design opportunity to support such needs, and discuss the constraints imposed by current proprietary software, and how open standards can work to the benefit of both, software providers as well as users.

Part I. Related Literature: Overlapping Socio-technical Microsystems

Because I am interested in the social structures¹⁰ that shape teens' social development (including the development of social, technological and civic identities), I focus on the social systems that have the most immediacy in teens' daily lives. In my dissertation such focus is on peer cultures, defined by social types, extracurricular activities (or school clubs), and mediated sociality (i.e., social interactions, association to categories, and inter-categorical relationships that are mediated by technologies). Social types are typically known in U.S. high schools through labels like Jocks, Nerds, Populars, Gamers, and Artsy to name a few. There is some evidence that social types are related to extracurricular activity patterns. For example, in Eccles et al (2003)'s study, "Jocks" was identified mainly by those involved in football, basketball and baseball, and tended to be male; whereas "Princesses"¹¹ was identified mainly by cheerleaders and those involved in "school-involved" activities like the student government, and cheerleading. Given the possibility that certain social types are more likely to be involved in certain extracurricular activities, I examine how social types are linked to activities (or how students perceive how they are linked) to investigate whether opportunities for participation in school leadership activities are equal (e.g., the Leadership club in school, organizing school-wide assemblies, and decisions affecting the whole student body). My goal is to further our understanding of how resource redistribution may facilitate more equitable participation in school leadership activities.

An ecological view of the social system studied can offer insights into framing analysis and findings in terms of resource redistribution (Hannan & Freeman, 1977, p. 931), such as allocating more school time and monetary funds than is currently allocated to school clubs which play key roles in connecting students who would,

¹⁰ By social structure, I refer to the patterned arrangement of social entities, which shape the opportunities that individuals embedded in such social structure have.

¹¹ The social type labels used by Eccles et al (2003) came from the movie "The Breakfast Club" from the 1980's.

without such clubs, become marginalized in the school's social milieu. An ecological view sees social systems as complex interacting systems that are non-deterministic, but conditional and responsive (Muuss, 1988). The relationship among social types and between social types and extracurricular activities can be viewed as microsystems that may overlap or interact with each other to form a social ecology. When the microsystems overlap a lot (i.e., are well connected to each other) and reinforce each other's values, those who operate across such microsystems can transition between them smoothly. Conversely, when the microsystems rarely overlap or endorse conflicting values, those traversing them face incongruence and distress, which may interfere with their healthy development as persons (Muuss, 1988 p. 304-5). With this in mind, in Part II, I first define the age group I study, their social psychological development, and why social types and extracurricular activities matter for this age group. Then, I proceed with establishing the level of abstraction at which I examine the social systems which influence teens. Throughout the chapter, I elaborate on the contributions I add to the body of literature in teens' social types and extracurricular participation. Thus, it felt appropriate to also include a discussion of methodological contributions, though the technicalities of the methods are described in the appendices.

Chapter 2. Peer Cultures: Social Types and Extracurricular Activities

2.1. A Social Psychological and Anthropological Perspective of Adolescence: Peers, Cliques, and Social types

As mentioned in the introduction, the sets of respondents in my study are high school teens. In the US, high school teens (from grades 10 to 12) are between the ages of 15 and 18 years of age. In developmental psychology, this is the *middle adolescence* period; whereas *early adolescence* generally occurs between ages of 11 and 14, and *late adolescence* between the ages of 18 and mid-thirties (Elliot & Feldman, 1990; Settersten & Ray, 2010; Smirnov, 2002)¹². *Adolescence* is the developmental stage in a person's life during which the person experiences biological and social-psychological changes as transitions into adulthood. Thus, even though I used age ranges to describe different periods of adolescence, it is both their psychosocial and biological development and not age which determines these periods.

In the rest of the dissertation, I will use the terms *teens*, *adolescents*, and *students* interchangeably, partly reflecting the terminologies that subfields of research have adopted. Studies of technology use tend to employ the more colloquial term "teens." Studies of developmental and educational psychology and sociology tend to use the term "adolescents." When data are collected from schools, the term "students" is used. My choice of terms is affected by the particular conventions in these fields.

The age range of adolescence is relative to the perspective used to define it. Socio-politically, the legal age to vote, marry, or drink determines adulthood, but does not determine the fulfillment of other developmental processes. Biologically, adolescence begins with the physical changes in the body during a person's transition to puberty (marking early adolescence), but adolescence does not end with the maturation of such physical changes.

¹² Researchers have argued that adolescence can extend into a person's 30's. See the anthropological perspective described later in this section.

Social-psychologically, adolescence is marked by identity exploration (Brown, 1990, p. 180), and the search for ideals and desirable future roles (Muuss, 1996a, p. 51). Within the social-psychological perspective, identity is constructed reciprocally; thus the role of others in this process matters. Brown (1990) proposes that as part of the development towards independence, adolescents seek to develop such identity independently of parents, and peer groups replace the role that parents had in supporting adolescents' psychological functioning, until adolescents become more psychologically autonomous. Thus, adolescents find peers who are accepting and compatible with their interests (Brown, p. 180). Some research (Hansell, 1985) supports the psychological importance of peer groups during this identity exploration phase, with those who are members of *cliques* (i.e., a limited number of adolescent friends who interact and hang out together regularly) being more likely than not to exhibit positive psychological wellbeing. Social-psychologically, the main distinctions between early- and mid-adolescence are: a) an increasing tendency to rely on peers (rather than parents) for issues of immediate relevancy to their social lives, such as popularity, appearance, illicit activity, and behaviors that help gain entry into subgroups (Brown, 1990, p. 181; Kandel, 1985; Muuss, 1988, p. 315); and b) claiming allegiance for an ideology and philosophy of life which often involves friends (Muuss, 1996a, p. 54).

The social-cognitive perspective presupposes that there are social-cognitive skills associated with the ability to evaluate which peer groups can best meet one's need for emotional support or social validation (Brown, 1990, p. 180-81), and adolescents develop such ability. *Social types* in high school, also known as *crowds* in the literature, are categories based on personality dispositions and activity patterns (Brown, p. 180). Under the social-cognitive perspective, adolescents use such characteristics to discern peers who can best fit their needs or to help navigate the social landscape of strangers in school.

Perhaps the perspective which generates the most debate is the anthropological one. Under this perspective, adolescence is the socialization period between childhood and adulthood, during which a person prepares to participate in society as a full member, including entering the labor force, and providing for a family (Muuss, 1996b,

p. 366). These transitions into society are occurring at later ages in contemporary society (Elliott & Feldman, 1990, p. 2; Settersten & Ray, 2010; Smirnov, 2002). Thus, the period between ages 18 and mid-twenties to thirties has received both treatment as *late adolescence* and “emerging adulthood” (Smetana, Campione-Barr & Metzger, 2006 p. 258). The anthropological perspective differs from the sociological perspective as it focuses on how adolescents affect society rather than on how society affects the adolescent (Schlegel & Barry as cited in Muuss, 1996b, p. 367).

I adopt a social-psychological and anthropological perspective of adolescence because I focus on how peer cultures (society) affect adolescents, and I am also interested in how adolescents can contribute to society. The social-psychological perspective explains my focus on peers as the context of adolescents’ social development. The anthropological perspective frames my interest in adolescents’ current participation in their immediate communities (e.g., school clubs and leadership in school). The two perspectives are interrelated because adolescents’ current participation in their immediate communities form the social structures that shape their future contribution to the society at large. The anthropological perspective to my focus pertains to broader societal impacts because research evidence suggests that engagement in civics and community organizations during adolescence predicts civic engagement in adulthood (Verba et al., 1995; Youniss et al., 1997), and civic engagement in adulthood is key to the foundation of our civil societies as it bridges private life with government behavior (Anheier, 2004, pp. 20-22).

Civic participation in high school is closely related to leadership, as the student government in both of the schools I observed was part of the Leadership class (a club-like elective where the elected student government, class representatives, and other students organized school assemblies and events). Students in the Leadership class have the most visibility as the activities they organize either require attendance, or have the most attendance when compared to other school clubs. Thus, I believe that leadership/civics types of activities such as being an elected member of the student government, being in the Leadership class, or organizing school spirit activities constitute relevant grounds for social identity development that are different from non-

leadership roles. Leadership roles matter because they can shape a person's self-esteem (Van Linden & Fertman, 1998), and low self-esteem is associated with high risk of social exclusion from the labor market and society (Kieselbach, 2003, p. 71). Thus, understanding how the social systems of school clubs (i.e., extracurricular activities), social types, and mediated sociality in high schools support or constrain adolescents' extracurricular participation provides a baseline from which to design interventions that offer more equitable opportunities for adolescents to take on leadership and civic roles, and to prevent long-term social exclusion.

2.2. Social Structural Conditions that Heighten the Prominence of Peers in Adolescence

The social-psychological and social-cognitive perspectives need to be interpreted within larger social-structural systems. How identity exploration evolves is partly shaped by social-structural conditions. For example, in contemporary individualistic societies where family and community centered traditions have been deemphasized and there are no fixed roles that youth grow into, an adolescent's future has become unpredictable. The older generation in an adolescent's network of relationships from childhood no longer provides sufficient or effective role models for the adolescent's search for future role identities. Thus, adolescents rely primarily in peers and some other adults for such identity exploration (Muuss, 1996a, p. 52).

Earlier research in adolescence tended to frame peers' perceptions as the reason for diverging adolescent and parental values (Coleman, 1981, pp. 30-34). Research also found that peers influenced adolescents on a different set of activities than parents (Kandel, 1985; Kandel & Lesser, 1969). However, the peer vs. parent divergence is not universal. Bronfenbrenner (as cited in Muuss, 1988, p. 318) found that such divergence is greater in the US and other societies with pluralistic political structures than in societies like the Soviet Union, where adult and teens share concerns around the same political core. Thus, adolescents are exposed to fewer contradicting expectations between close peers and adults. Further, even within the US, not all adolescents experience the incongruence and incompatibility between parents and peers as some literature suggests. Offer and Offer (1975) found that about 23 percent

of respondents in their longitudinal study of normal¹³ adolescent males went through adolescence without major conflicts with their parents (pp. 40-42). Yet, for most adolescents, the influential force of peers is undeniable. This may be partly due to the social-structural conditions of the US school system.

Outside of school courses, adolescents spend twice as much time with peers (29%) as with other adults (15%)¹⁴ (Brown, 1990, p. 179). During their pre-college years, many adolescents transition from a smaller cohort of peers in elementary school to a larger cohort during early adolescence in middle school, and an even larger cohort during their middle adolescence in high school. In seeking strategies to cope with the large changing number of peers, many adolescents form their own *clique*, or a limited number of adolescent friends who regularly “hang out together” (Brown, p. 177) as a way to prevent having to navigate alone the plethora of new faces (Brown, p. 181). Another strategy is to develop a categorization scheme for social types or crowds. Such categorization enables adolescents “to negotiate relationships with peers who remain acquaintances or strangers” (p. 181). Knowledge of these social structural conditions prepares the reader to interpret my dissertation in light of the social structure of the US educational system, of individualistic and pluralistic values.

Regardless of why adolescents label each other into social types, the effect of judgments that come along with social type characteristics can have long lasting effects on adolescents’ development. For example, Brown & Steinberg (1990) found that adolescents underperformed academically to not be labeled “Nerd.” Horn (2003) found that adolescents evaluated the exclusion of “druggies” as more acceptable than the exclusion of other social types from school-spirit types of activities like basketball and the student council (p.77). These activities, based on my observation of two high schools in the Pacific Northwest in 2009-2010, are arguably more visible, and are amongst the few activities through which students gain widely recognized leadership

¹³ Respondents who scored one standard deviation from the mean on a self-image questionnaire made up the sample pool.

¹⁴ This statistic is obtained after discounting the time spent in classroom instruction, which constitutes 23% of an average student’s waking hours (Brown, 1990, p. 178).

opportunities. Clearly, adolescents' social perceptions of social types in school can have a great effect on their own behavior as well as on systematic exclusions. Thus, in the next section, I further elaborate on the importance of **social perception** in the study of social types, particularly since the data I collected are based on adolescent perceptions.

2.3. Social Types: Perceptions Matter

First, I'd like to clarify my choice of the term "social types" over "crowds," the technical term used in the literature to refer to the categories in school identified by labels like Jocks and Nerds. I chose "social types" to avoid confusion with the notion of people massed together for a common event (e.g., crowd of fans), often associated with the term "crowd." I also hope that by speaking of social types in high schools, my work is more readily understood without a definition of "crowds" vs. "cliques."

As social types in schools are identified by labels, which often are vague in meaning and conjure stereotypical characteristics, Brown (1990) suspects that some may believe that an adolescent's membership in a social type category matters less to him/her than his membership in a clique. To counter such belief, Brown states that "clique affiliation indicates merely who an adolescent's close friends are; crowd affiliation indicates who an *adolescent* is—at least in the eyes of peers" (p. 184). As mentioned, social psychologically, adolescents seek out peers for social validation. Thus, how others perceive the adolescent can overshadow the adolescent's sense of self if such perception constrains the adolescent's opportunities for socialization and confidence development. Specifically the perception of those from different social types than the adolescent's own type (the reference groups) can have negative consequences on the adolescent's adaptation through adolescence (Brown, pp. 184-5).

For example, Horn (2003) found that exclusion was considered to be more alright when adolescents only knew the excluded person's social type than when adolescents knew more information specific to that individual (e.g., the activities the individual does, how s/he does in school, etc.). Unfortunately, since social type labeling can be a strategy used to cope with acquaintances and strangers in school (Brown,

1990, p. 181), this means that adolescents who resort to such strategy to navigate the social landscape in school will tend to think that excluding those of whom they know little (i.e., not friends) is alright, and contribute to a hostile social milieu in school. Such examples are corroborated in Brown (1990)'s statement that those who find supportive friendships and are labeled into social types of which image they find compatible with their pride and senses of selves are more likely to adapt successfully throughout high school; whereas those who cannot find their friendship niche and are identified by stereotypes with which they do not agree are likely to go through maladaptive transitions in school (p. 185). Perhaps not being excluded or treated with hostility enables smoother social experiences than otherwise.

In short, how social types in school are perceived by its students in general matters more to an adolescent's opportunity to navigate the social landscape in school, than an adolescent's self-labeling (though typically, adolescents have a good sense of how others see them)¹⁵. This is one of the reasons I use perceptual data to identify the central social types in the school's social life, the types of extracurricular activities which characterize each social type, and the social types of respondents' friends.

2.4. School Clubs: Patterns of Extracurricular Activities for Social Types

As mentioned, some evidence exists that social types in high school are related to activity patterns (Eccles et al., 2003), both in terms of deviant and academic behavior and of participation in *school clubs* or *extracurricular activities*, which are not required by school curricula, but take place in school. For short, I will use "school clubs" to refer to extracurricular activities, or use them interchangeably. Given the potential relationship of social types and school clubs, we can posit that school clubs also contribute to adolescents' social development in school, but how?

Although Eccles et al. (2003) find some evidence that some social types reflect activity pattern, their study was primarily focused on assessing social types in relation to risky (e.g., alcohol and drug use) vs. academic activities. Eccles et al. do examine

¹⁵ This ability to know how others view oneself aligns with Cooley (1964)'s notion of the self-looking glass (p. 184).

some social types, but only use five outdated social types drawn from a fictional movie in the 80's (Jocks, Princesses, Brains, Basket-cases, and Criminals). Thus, Eccles et al. do not capture the nuanced differences between the social types who may be involved in similar activities, but who portray characteristics from the opposite extremes of an activity (e.g., being an industrious musician vs. an carrying the portrayal of an “emo” interested in dark music but not able to produce it well given tendencies for depression and drug use).

My study fills in such gaps by examining the association between diverse localized social types and school clubs. I use social types initially identified by teachers who are most familiar with students' social lives, and subsequently modified these social types according to input from students through pilot surveys. Some social type labels were then modified to ensure they were understood and used consistently in the surveys administered in the participating schools. Further, instead of assessing respondents' self-reported social types and participation in school clubs, I use respondents' *perceptions* of which school clubs characterize each social type.

This is an important contribution to prior work for various reasons. As mentioned, perceptions matter. Perceptions affect individuals' performance and opportunities for participation in group activities. How others perceive or label an adolescent may create impressions of praise when the label is meant¹⁶ favorably, or hostility when the label is not. Such perceptions may lead the adolescent to adjust his/her behavior negatively (e.g., underperform as illustrated in Brown & Steinberg, 1990) to prevent receiving undesirable labels, or be more likely to be excluded from participation in group activities for naturally falling into a low-status social types (e.g., Druggies) (Horn, 2003).

Further, in their study of social types and their participation in school clubs, Eccles et al (2003) only found distinguishable patterns for Jocks and Princesses, with a majority of male adolescents involved in a high profile sports team (e.g., 82% of

¹⁶ The same label can be used in positive and negative ways. For example, Jocks may mean athleticism and leadership, but also convey the image of being jerks.

basketball, 78% of football, and 78% of baseball) identifying themselves as Jocks, and a majority of female cheerleaders (71%) identifying themselves as Princesses. Eccles et al. did not discern “activity-based identities” for the other social types used in their study (Criminals, Brains, Basket-cases). According to Eccles et al., this was primarily due to the high proportion of adolescents in all social types who participated in at least one team sport (p. 878). However, the lack of activity-based identities in the other social types may also be due to the lack of specificity in them, as mentioned above. Based on the popularity of sports amongst current adolescents (Lin & Farnham, 2003), I expected to face a similar issue if I conducted my study using respondents' actual participation in school clubs. Thus, by using perceptual data on the two school clubs in which a social type is most active (i.e., the school clubs that best describe a social type), I am potentially able to avoid the lack of discernible patterns caused by the pervasiveness of sports across social types.

Using perceptual data on social types (which respondents reported about the activities in which a social type is most active), I am also able to assess whether the aggregate perceptions of social types in school are related to adolescents' self-imposed norms. To clarify, Snyder, Tanke, and Berscheid (1977) studied whether male respondents' pre-telephone conversation perceptions of an assigned female (based on a fake photograph and real demographic characteristics) matched third person judges' assessments of the female's attractiveness. The judges' were not aware of the study's purpose or assignment conditions in the experiment. They also did not know how the female looked. The assessments were based only on the female portion of the recording. Snyder et al. found that females who were perceived by the male respondents as attractive (based on fake photographs prior to the phone conversation) tended to be assessed by third person judges as behaving more attractively over the phone than females who were initially perceived as unattractive. In other words, when a person uses perceptions based on stereotypes as guides for regulating the person's interactions with an “other,” the resulting behavior of the person may elicit and promote behaviors in the other that fulfill the stereotype, even if this other person does not behave in such ways with those who know him/her (Snyder et al.). Based on

this logic, an interesting question arises about adolescents' perceptions of school clubs and social types: Are the aggregate perceptions of school clubs that describe social types related to the norms and logic guiding adolescents' choices (or lack thereof) of school clubs? In other words, do adolescents who don't think they are perceived as Populares try to take part in clubs that characterize the Populares? And if not, why not? These are examples of the types of specific questions that research question 4 will address (i.e., What additional insights are gained about how the socio-technical ecology in schools contributes or constrains its student's social development?)

2.5. Overlapping Social Types: Channels for Friendships and Participation in School Clubs

Another contribution I bring to the body of literature on social types in high schools pertains to the level of abstraction of the analysis (or level of analysis for short) and the method I use to understand the ecology of social types in high schools.

2.5.1. Relational level of analysis: Examining how opportunities and constraints are channeled

By level of analysis, or level of abstraction of the analysis, forms an organizational hierarchy. For example the atom being the individual, the next level up in the hierarchy being the family or other small group, then the community or organization in which the family or small group has membership, etc. Many studies' level of analysis are at the level of the individual, even though they report aggregate findings (e.g., those of high SES are more likely to be in high-status social types—in this example, SES is an attribute of the individual used to predict an outcome, and the social type they fit into is the outcome). My focus is not on respondents' attributes as predictors of outcomes, but on how social types are related to other entities (like school clubs, or other social types), and how that relationship conveys something about an ecology that channels opportunities vs. constraints for behavior (e.g., participation in types of school clubs, types of friendships), which in turn shape the trajectory of adolescents' social development. The relationship can be of many types, including some measure of similarity or overlap between entities, or an actual behavior from one entity to another such as admiration, advice, or communication.

The types of relationships I examine in this dissertation are in the form of similarity or commonality based on overlapping characteristics between social types. Thus, the level of analysis is relational, examining: (a) the perceived association between social types and school clubs, as a way to examine whether opportunities are equal (research question 1); (b) how social types are similar or overlap with each other, based on common friends across social types (research question 2, on the channeling of friendships that exists across social types); and c) how the similarity between social types differs if viewed in terms of mediated communication (above a frequency level) with common friends across social types (research question 3, on how the channeling across social types differs per technology). The cross examination of (a) and (b).

Why is this level of analysis important? The importance of such level of analysis can be better understood in terms of the nature of the problem space. When examining individual attributes as predictors, an assumption is made that it is such attributes that enable certain outcomes, all other things equal. However, an attribute based analysis is less conducive to revealing ways in which social information (norms, values, practices) are channeled across social micro-systems (e.g., social types), and how resources can be redistributed to enable adolescents having different attributes to experience similar outcomes. A relational analysis, on other hand, is more conducive to making such revelations because it enables us to see which entities are similar, and what channels such similarity. In understanding such channeling, we can assess whether and what kind of redistribution of resources would integrate entities of interest.

For example, by understanding which school clubs are perceived to be populated by the most popular social types (e.g., Football and Leadership or the student government class), and whether the most popular social types (e.g., Jocks and Populards) channel friendship across diverse social types, then we can gauge whether the high status school clubs are playing a bridging or integrative role. We can further assess which social types play bridging roles—channeling diverse social types or interconnecting school clubs which would otherwise be disconnected from the rest of the school clubs in school. We can then assess whether creating clubs that play

interconnecting roles in one school into another school may produce the same outcomes, or identify the conditions under which effective bridging by social types or school clubs occurs.

As mentioned in the introduction, underlying this interest in understanding channeling and bridging for the purpose of redistributing resources is my belief that although participation in extracurricular activities is important for its beneficial outcomes (Eccles & Barber, 1999; Eccles et al., 2003; Fredricks & Eccles, 2005), participating in leadership/civics types of extracurricular activities which provide opportunities to affect the school as a whole builds a sense of leadership and confidence that may be essential to community and civic participation in adulthood—that sense of not being at the fringe and being able to effect change.

2.5.2. Overlapping social types: How the method used contributes new insights

Social Types in High School are not mutually exclusive. They overlap in characteristics (e.g., the friendships identified in them, the activities that describe them). Further, the social type into which an adolescent is categorized is restricted to the ones recognized by peers (Brown, 1990, p. 184) because social types are about perceptions. That is, an adolescent may perceive him/herself as a “punker,” but if there are no other “punks” in the school, then the adolescent is perceived by his peers as being in his own social type (Brown, p. 184). So, an adolescent may be perceived by peers (or respondents in my study) to fit into more than one social type category recognized by peers, or not clearly fit into any category (Brown, p. 184). I examine these overlaps in my dissertation.

Such overlaps are important because social types can create an environment of hostility when labels connoting negative characteristics are only used between completely non-overlapping social types. Or, if such a hostile environment existed and only a few students actually embodied both types of characteristics, these students may be in distress, finding it difficult to balance the characteristics of both social types, or be forced to forfeit interests associated with lower-status social types at the

expense of skills development (e.g., Brown & Steinberg (1990)'s finding of Nerds underperforming to avoid such label). In other words, the overlap between social types, if strong, can act as a channel connecting adolescents from different social types; if weak, can be a source of distress for some adolescents.

Given that social types are about perceptions and can overlap, I contribute to this body of work by adopting a method that acknowledges social types as perceptions and examines their overlaps. Below, I describe at a high level how I obtained the overlap between social types:

- 1) Respondents are asked to identify the social types of the three friends with which they spend the most time together.
- 2) If a proportion of respondents have friends in two social types, say Brain friends and Gamer friends, then the social types Brain and Gamer overlap by *common friendships*—the set of respondents who have friends in both social types.
- 3) This analysis is done for all social types such that a network of overlaps across social types is created.
- 4) Social types which overlap with many other social types and are the only channel between many social types would tend to be mapped at the center of the network.

To my knowledge, in studies of adolescent social types in high school, focusing on the overlaps and channeling roles of social types has not been done¹⁷, yet is important. Whether or not two social types overlap by common friendship conveys the extent of cohesion vs. division and the potential to cross categorical boundaries. The social milieu in school would be very different if many adolescents had Popular and Punk/rocker friends alike (overlapping social types) vs. if no adolescents had friends in such social types (not overlapping social types). Thus, this method accomplishes both,

¹⁷ To be fair, Hansell (1985) has studied bridging or “broker” roles, but she analyzed friendship networks, not social types.

using social type perceptions and examining their overlaps to gain insights into their channeling roles.

In the next chapter, I describe seminal work which sets the foundation I use for studying the overlap between social types and their representation in two-dimensional space.

Chapter 3. The Duality of Persons and Categories in Social Space: Conceptual Foundations behind my Methods

In this chapter, I describe the main conceptual foundations behind the methods used in my dissertation: Breiger (1974)'s "Duality of Persons and Groups," and Sorokin (1927)'s concept of "Social Space." The former pertains to the concepts guiding the analysis of the overlaps or similarities between social types; the latter pertains to concepts that explain how social types could be mapped or represented in social space.

The title of this chapter uses the term "categories" instead of "groups," as used in Breiger because the term "group" can be used both conservatively to refer to the number of people who are considered to be a unit of some sort based on their relationship (e.g., a team, a tribe, a clique), or more loosely to refer to the set of people that are classed together based on some similarity, even if they are not linked by direct interpersonal relationships. In the latter sense, "group" is used akin "category," and is the interpretation I have used when adopting Breiger's framework to my data. Such interpretation of group as category is also evident in Tajfel (2010). Nevertheless, when describing Breiger's work, I will retain his original terms.

3.1. The Duality of Persons and Social Groups

The notion of "Duality of Persons and Groups" can be better understood when put in comparison to earlier, more obvious notions about "linkages" between entities. Earlier¹⁸ perspectives restricted individual's linkages to other individuals by their social relationships, and individual's linkages to collectivities by their membership. To Breiger (1974), these two types of linkages were insufficient to represent individuals' linkages to society (p. 183). Breiger's duality is about how individuals' linkages to other individuals can occur not only directly via their interpersonal relationships, but also via their common membership to collectivities (e.g., interlocking directorates); and about how linkages to collectivities can occur not only directly via an individuals'

¹⁸ With "earlier," I refer to perspectives prior to Breiger (1974). However, although Breiger's analysis of linkages between collectivities based on people's shared membership across two collectivities is known to many researchers involved in social network analysis, Breiger's approach is still not the main approach to sociometric analysis, which tends to focus on people's direct relationships to one another.

membership to that collectivity, but also via other individuals who are connected to that collectivity (e.g., connected by 'love' to one's country (Breiger, p. 183), or one hacker connected to another by their common ideology and technology practices¹⁹). I leave out Breiger's mathematical proofs for such dualities, and focus on explaining them conceptually, though I encourage the mathematically oriented reader to consult Breiger. I must also clarify, that although I describe Breiger's duality next, I do not apply all of Breiger's treatment of the "Duality of Persons and Groups" in my analysis. Nevertheless, his concepts are relevant to understanding the assumptions guiding data interpretation.

(a) *Linkages between persons via their common affiliation to collectivities*: If we knew that John was a member of the school band, and Anna was too, we could infer that John and Anna are linked in some way. Even if they were not actually friends, by being in the same school band, they have a link of sorts, be it knowledge of behavioral norms, space-sharing, some commonality in their schedules, or a minimum knowledge in music. If John and Anna shared many more of the same memberships in other school clubs (their set common memberships), then their linkage of "common affiliation to collectivities" is stronger, and we can infer that by reaching some of the school clubs in which John is a member, we can in one way or another reach²⁰ Anna. In my dissertation, I examine the common affiliation to school clubs between social types (rather than between individuals). Based on the data used for the analysis (students' perceptions of school clubs in which social types are most active), social types are representations of individuals of particular characteristics²¹. With this notion of social types, two social

¹⁹ The hacker example is added by me.

²⁰ This reach needs to be qualified by the type of relation studied. For example, if the relation examined is knowledge of music, then John can be reached.

²¹ In theory, examining the common affiliation to school clubs between social types should be called "linkages between entities via their common affiliation to collectivities." If the data on social types used for this portion of the analysis were students' actual affiliation to social types, then, the analysis would put Breiger's first part of the duality into a double layered duality: Individuals of a particular social type are linked to each other by their common affiliation to the social type; and these social types are linked to school clubs by the perceived common affiliation they have to school clubs. However, the data used was students' perceptions of school clubs in which social types are most actively involved. In such data, the social types are mere representations of characteristics and not concrete collectivities to which a set of students are explicitly affiliated.

types, say Jock and Popular, are linked by being affiliated to a common set of school clubs, such as football, basketball, and the Leadership class.

(b) *Linkage to a collectivity by being connected to individuals who are connected to that collectivity*²². To clarify this, I first need to set the foundation that two collectivities are connected to each other by the persons who have affiliations to both collectivities. In other words, if Anna is both a member of the school band and the school's string quartet, then we know some linkage exists between the school band and the school quartet through Anna. This linkage would be even stronger if many more people in school were simultaneously members in both the school band and the string quartet. That is, the school band and the string quartet are connected in so far as there are people who have memberships in both groups. Further, if John spends a lot of time with Anna, then by his friendship to Anna, he is also connected to the band and the string quartet because he is likely to gain insight about some aspect of the band or string quartet through Anna, such as the characteristics of these groups, their schedule, or shared friendships. In fact, given transitivity²³ and homophily²⁴, it is likely that John is also affiliated to either the band or the string quartet, but not having such information, we can still infer John's connection to these groups or his reachability via these groups. Similarly, if many students were affiliated with Partyer friends and Popular friends, then Partyers and Populares would have a linkage based on the students who are affiliated to both social types. Further, those who are friends with Partyers are also connected to Populares (by knowing their characteristics or having common friends) by their connection to Partyers.

In the context of social types in high school, the two types of linkages described above (a and b) concur with literature on adolescent peer cultures: that the social types in school not only position adolescents in various categories and social status, they also channel adolescents into interactions and common activities with

²² I apply this notion of duality conceptually. Mathematically, I only apply the calculation of social type overlaps based on proportion of students who have friends in two social types.

²³ Transitivity refers to the likelihood that A and C connected by the connection that they each have with B.

²⁴ Homophily refers to the similarity between persons who associate with each other.

those who share that social type's reputation (Smetana et al., p. 267). In this dissertation, I do not actually measure the reach of adolescents based on their friendships with people in one social type. However, I do draw on the basic foundation that the proportion of adolescents who have friendships in the same pair²⁵ of social types, say Brain and Popular, create a linkage or overlap between the Brain and Popular. Such overlap not only indicates a connection between people in the Brain and Popular social types by the proportion of adolescents who have friends in them, but also signals that people who are Brains can be reached by one's connection to people who are Populars. Similarly, those linked to Brains or Popular can also be reached by one's connection to Brains or Populars.

Methodologically, this means that we no longer need to depend on collecting data about direct relationships between two people or between two groups or categories for everyone in the population, but that these linkages can be computed from data about people's affiliation to social types. We can know that two adolescents are connected by their common affiliations to a social type, even if we don't have data about the two adolescents' personal interactions. We can also know that two social types are interconnected by the many adolescents who have friendships in both social types, even if we do not have data about how the adolescents from each social type interacts with adolescents in the other social type.

Breiger's "Duality of Persons and Groups" also creates a symmetric quality (the links are overlaps, and thus have no directionality). Such symmetry enables the use of simpler social network analysis methods. I provide more details on how these linkages can be computed in Appendix 3, and proceed below to describe Sorokin's concept of Social Space, as it also informs my method.

²⁵ Social type pairs are the basis for studying overlaps, and how such overlaps form a network of social types linked via such overlaps.

3.2. Social Space: Defining the Social Location of People, Entities and Social Phenomena

Social Space is “the universe of human population” (Sorokin, 1927, p. 6), distinct from geometrical space in that “persons who are very far from each other in geometrical space—[e.g., lovers in distant countries, kinship separated by immigration]²⁶, or bishops of the same religion...—may be very near each other in social space” (p. 3). The concept of Social Space is relevant to my dissertation because it lays the conceptual foundation for how I represent the overlaps or similarities between sets of social types in two-dimensional space. Such visual representation is a key part of revealing how friendships are channeled across social types, and how students perceive the relationship between school clubs and social types. The visual representations also aim at facilitating thoughts about resource redistribution (which as discussed may enable more equitable participation in school leadership activities).

A closely related concept to Social Space is that of Social Distance. In the quotation above, the farness and nearness that Sorokin described referred to the Social Distance between the persons in the examples. Thus, although the term “distance” is used, Social Distance refers to both distance and *proximity* between social entities (people, organizations, groups, social types), defined in Social Space rather than geometrical space (i.e., the physical positioning of two entities), although the two can coincide at times (see Bradner & Mark, 2002). Social Distance and Social Proximity are inseparable terms. Social Distance refers to how entities are *related* to each other in Social Space, and so people may actually be meaning “Social Proximity” when they use the term “Social Distance.” As Simmel (1971) puts it in his treatment of the concept in his book chapter of “The stranger,” being a stranger to a culture or a community requires being both, “outside it and confronting it” (p. 402-3). It is the “nearness and remoteness involved in every human relation” (p. 402). Thus, it makes no sense to speak of Social Distance if the entities are not even related in any remote way, for “to be a stranger is naturally a very positive relation...” (p. 402). Thus, in the visual

²⁶ Examples in square brackets are mine rather than Sorokin’s, so as to provide a more contemporary context to describe Social Space.

representations of social types I use in this dissertation, links between social types represent, at the same time, the Social Distance between social types that directly overlap, and between those which do not directly overlap but are related by their linkage to a third social type. In other words, the social types have similarities, but also differences, as they do not fully overlap (or they would be the same social type).

Many others have conceptualized Social Distance (e.g., Park, 1924; Bogardus, 1925). However, their conceptualizations focused on psychological aspects, such as “grades and degrees of understanding and intimacy,” which was measured by racial attitudinal scales. These treatments of Social Distance are beyond the scope of this dissertation, which focuses on how social types act as channels of social information (or information about social relationships such as values, norms, and access to social support), with the aim of uncovering opportunities to be involved in leadership/civics types of school clubs. Thus, it makes sense for me to adopt Simmel and Sorokin’s treatments of Social Distance because they focus on the relational aspects in people’s Social Space.

Both Simmel and Sorokin suggest that Social Distance is about Social Proximity and positive relations in Social Space. Further, Sorokin defines Social Distance as the measurement of a person’s relation to social entities relevant to that person. These relations include: (1) the person’s relation to specific groups, and (2) the relation of these groups to each other within a population (Sorokin, 1927, p. 5). As mentioned, Breiger expands these relations into how person to person relations can be obtained from point (1) above (people’s relation to groups); and how people’s relations to various groups can be obtained from their relation to other people who are connected to a group, which in turn is related to point (2) above (how groups are related to each other). Thus, in my dissertation, Sorokin’s concept of Social Distance and Social Space, and Breiger’s “Duality of Persons and Groups” beautifully come together, the former defining conceptually how specific entity relationships define a Social Space; and the latter providing mathematical proof for how these entities are further related to other entities by their common relationships.

In Part II (Research Methods and Setting) I provide more detail the data collected. In Appendix 3, I describe how I manipulated the data and in Appendix 5, how the data was visually represented in two-dimensional space.

Part II. Research Methods and Setting

In Part II, Chapters 4 and 5, I describe the methods and setting of my research.

Chapter 4. Mixed Methods: Diversity of Paradigms and Methods

In designing my dissertation study, I struggled finding the right fit between research paradigm and research methods. For reasons described later in this chapter, I was inclined to use mix methods research and knew I needed to do so if I wanted to achieve the levels of understanding I would like from my data. However, the literature I first encountered tended to prescribe (in a textbook-like way) how paradigm and methods could be mixed and did not truly capture my research design. Instead of succumbing to the gap between the “logic in-use” and “reconstructed logic” (Kaplan, 1998, pp. 3-11) that so often exists between research implementation and reporting, I choose to more genuinely describe the logic and practice behind the Mixed Methods Research I conducted.

Recent writings on mixed methods argue for the mixing of any or all of paradigms,²⁷ methodology,²⁸ methods,²⁹ and rhetoric³⁰ because mixed methods is characterized by “methodological eclecticism, paradigm pluralism, and diversity at all levels” (Teddle & Tashakkori, 2012, p. 776). Yet, Mixed Methods Research has only *formally*³¹ existed for 15 year or so (Teddle & Tashakkori). Thus, those trained in more conventional research traditions (including myself), who believe each method has a specific paradigm match, may still need me to elaborate on why, how, and what can be mixed.

The belief that research should be designed with the right paradigm-method match originates from conventions which purport that there are paradigms that (supposedly) underlie each method; or that research questions and methods should be

²⁷ Paradigms are world views which guide beliefs about how knowledge is created in scientific inquiry, about the existence of one, multiple or any reality, about the role of researcher values, how to treat context, and how to report research.

²⁸ *Methodology* refers to the approach and process of conducting research..

²⁹ *Method* refers to the techniques used for data collection and analysis.

³⁰ *Rhetoric* refers to the language style used in reporting research.

³¹ Arguably, researchers have conducted mixed methods research for longer than 15 years, but having a body of literature on it has only formally existed for about 15 years.

guided by one and only one paradigm view since some paradigms contradict each other on their perspectives of epistemology,³² ontology,³³ axiology,³⁴ and methodology,³⁵ in ways that cannot be reconciled. Yet, if such conventional wisdom defined research, what would all the valuable findings from Mixed Methods Research in Caracelli & Green (1997) be called³⁶? Overtime, more researchers published on the subject of Mixed Methods, and they helped me realize that not fitting in a supposedly compatible paradigm-method approach is a strength rather than a limitation. Based on my review of such literature, the reasons purists may find mixed methods (like mine) to not fit in with the expectation for paradigm-method coherence include those listed below, each explained below the list:

- 1) the misleading labeling of the quantitative and qualitative paradigms;
- 2) the principle of the drunkard's search in the incompatibility thesis; and
- 3) distrust of a researcher's ability to implement different methods with the same rigor.

1) *The misleading labeling of the quantitative and qualitative paradigms.* The labeling of quantitative and qualitative research is misleading because neither methods nor paradigms are clear-cut quantitative or qualitative. In Creswell (2004)'s treatment of Mixed Methods Research, he writes of quantitative, qualitative, and mixed methods

³² *Epistemology* concerns how knowledge is created and the relationship between the researcher and the researched. Positivist epistemologies believe in direct impartial observation by the researcher, whereas Interpretivist epistemologies believe knowledge is created through social interaction with the participants.

³³ *Ontology* concerns the nature of reality; whether there is a singular reality (e.g., reject or fail to reject a hypothesis) or multiple realities. In the former, context is excluded and seen as something that will bias results. In the later, context is part of understanding the realities.

³⁴ *Axiology* concerns the role of values in research. On the spectrum closest to positivist traditions, research values neutrality and objectivity, but do not explicitly recognize that such values taint their findings. On the other extreme, researchers acknowledge the inevitable presence of values and the challenge of not just conveying their own views in research, but also presenting the social experiences of the research participants.

³⁵ *Methodology* see footnote 28.

³⁶ In Caracelli & Green (1997), the authors provide short summaries of mixed methods studies as examples of different types of research methods.

research as though they had their own worldviews or paradigms³⁷ (p. 511). However, this labeling is misleading (Teddle & Tashakkori, 2012, p. 780). At the paradigm level, the concern is in terms of knowledge, reality, and methods appropriate to address the beliefs about knowledge and reality. Thus, a study can have a positivist paradigm (presumably quantitative under Creswell's perspective), with a research designed to test hypothesis, yet use qualitative data to investigate how to update measurements where theory and constructs are out of date (e.g. social theory which does not incorporate technology-mediated interactions). Then, such updated measurements can be used in an experiment. Creswell & Plano Clark (2010) further classify Mixed Methods Research Designs into ways to mix quantitative-data-and-analysis with qualitative-data-and-analysis, presuming that there is indeed a division between these types of data and analyses. Yet, the discrete categorization of methods as qualitative or quantitative is not straightforward (Caracelli & Greene, 1997, p. 20). Take content analysis, for example, data can be qualitative and data analysis about text done quantitatively. Thus, in my dissertation, I attempt to move away from speaking in terms of quantitative and qualitative data and analysis, to acknowledge the richness and complexities of data.

2) *The principle of the drunkard's search in the incompatibility thesis.* The incompatibility thesis, put forth by Howe (1988), describes the belief of some paradigm purists: that mixing methods that should naturally fall under different paradigms ignores the deep epistemological differences that are irreconcilable (p. 10). However, such thesis operates much like the principle of the drunkard's search, choosing to look for his lost key, not where he dropped it, but under a street lamp where there is light (Howe, p. 13; Kaplan, 1998). For Howe, those who advocate that the methods that work depend on the paradigm within which one is working, are letting the "lights" of the paradigm determine where to look. Will that provide a good understanding of the phenomena studied if we already know that some of the answers lie where there are no

³⁷ Though Creswell uses the term worldview, he references Teddle & Tashakkori (2012)'s incompatibility thesis, which is in essence one between paradigm and method. Thus Creswell used the term worldview to refer to paradigms. Creswell & Plano Clark (2010) go into further detail on the various paradigms, and when doing so, they do not just use the quantitative and qualitative labels. However, in my reading, their treatment of mixed methods research lies on the presumption that there are clear-cut distinctions between quantitative and qualitative data and analysis.

“lights,” or outside what is accepted in the paradigm? Since my answer is no, I side with the belief that multiple paradigms can be associated with any method and vice-versa (Teddle & Tashakkori, 2012, p. 779-780), and that different paradigms can be combined (Greene, 2012) to provide a better understanding of the phenomena of study. Caracelli and Green (1997) provide successful research examples in which paradigms and methods are combined or linked through various design options.

3) *Distrust of a researcher's ability to implement different methods with the same rigor.* The concern behind methodological bilingualism (or even multilingualism) cited in Teddle & Tashakkori (2012) is that it only exists superficially because researchers may not be trained properly in any particular tradition (e.g., in ethnography) (p. 777). However, as with multilingualism and multiculturalism, early exposure and learning creates proficiency. Further, as new mixed methods scholars mature, future researchers will have mentors who themselves were bilingual or multilingual in methods. Thus, arguing against mixed methods on the basis of training is not a good reason to avoid mixed methods research, for the more researchers engage in it, the more examples exist for researchers to evaluate, assess, and learn.

4.1. The What and Why of Mixed Methods Research

Having justified that Mixed Methods Research can legitimately occur at the paradigm, methodology, and method level, I now define it and elaborate on why we would use research methods from a scientific development stand point. *Mixed Methods Research* is scientific inquiry which involves the mixing of research paradigm, methodology, and/or methods, with the minimum purpose of gaining a more comprehensive understanding of the phenomena studied.

The arguments brought forth by proponents of Mixed Methods Research on why use Mixed Methods Research in social inquiry include: understanding is more complete with multiple methods; different methods complement each other's weaknesses (Caracelli & Greene, 1997; Creswell & Plano Clark, 2010); and because Mixed Methods Research offers:

dialogic opportunities to generate better understanding of important social phenomena... because it legitimizes and respects multiple responses to these critical issues and invites dialogue among them (Greene, 2012, p. 55).

In other words, Mixed Methods Research can contribute to the advancement of science through dialogue between methods and paradigms; especially if their collaboration can enable better understanding of social phenomena and offer practical implications. This dialogic opportunity is an extremely important role that researchers and graduate students should be aware of because such awareness can prevent us from amplifying the gap between the “logic in-use” in our research implementation and the “reconstructed logic” in our reporting. By knowing that we can dialogically contribute to how different paradigms and methods can work together for the improvement of science and understanding of societal issues, we might perhaps be less concerned about failing in a prevailing, yet not unique standard, and more openly and genuinely report our methodology.

I use Mixed Methods in my dissertation for all the reasons above. In addition, I subscribe to Greene (2012)’s political commitment as a reason for using Mixed Methods Research. As she states, conducting research which mixes paradigms, methodologies, and methods “is further consonant with my political commitments to the fundamental acceptance of difference in the world and to dialogue as a solution to strife” (p. 758). This stance resonates with my research, of which purpose, and design I describe in Chapter 5. Next, I describe my own framework of Mixed Methods Research.

4.2. “Hierarchically Organized Mixed Methods”: Making Sense of Hierarchical Systems

As described above, reasons for using Mixed Methods Research include to provide a comprehensive understanding of social phenomena; the need of different tools to address the highly complex social phenomena; the limitations of one technique being complemented by another; the contribution to science by bridging dialogue between different perspectives; and the political commitment to embrace difference.

I add to this list of reasons that Mixed Methods Research is necessary to make sense of the hierarchical nature of social systems, and call this type of mixed methods “Hierarchically Organized Mixed Methods.” I use hierarchy, not to mean authority, power, or status, but in the way that Simon (1969/1996) uses it to explain the basic structure of complex systems. Simon writes about hierarchy as something that exists naturally in complex systems (p. 184), from matter (e.g., molecules are made of atoms, which in turn are made of elementary particles) to social organizations (e.g., a community is made of smaller groups, like families and businesses, which in turn are composed of individuals). Bundling “things” into hierarchy has its advantages. For social inquiry, hierarchy can also be a strategy for organizing complex structures. Hierarchy also simplifies cognitive load because it enables one to choose a level of abstraction in the hierarchy and focus on the components within that level of abstraction while temporarily ignoring what happens within each component or above that level of abstraction. Once analysis at that level of abstraction is done, then one can examine how that level of abstraction interacts or interfaces with the larger organization which contains it, or with the elements that make the components in the lower level of abstraction. The way I see it, there are no rules on which level of abstraction in the hierarchy to examine first. That will depend on the set of research questions asked and the social behavioral theories informing the researcher.

For example, within a school, at one hierarchical level, students’ extracurricular social life can be organized in terms of social types. For my purposes, I will call this the *mid-level hierarchy*—a network of social types (see the overlaps between dotted ovals in Figure 4-1). Figure 4-1 illustrates one type of entity only at the mid-level hierarchy. However, there could be more than one of entity, such as social types and school clubs. There could also be more than one way of examining the relationship between the entities (e.g., overlap based on common friendships nominated, vs. based on a technology-mediated interaction with such friendships). Within this mid-level hierarchy, each social type is a microsystem composed of students and their friendships (see solid colored circles within the dotted ovals in the same figure), forming networks of social relationships; call this the *micro-system level hierarchy*. The

school is the larger organization above the mid-level hierarchy that contains the social types and the students; call it the *school-level hierarchy* (represented by solid large circles, labeled School A and School B in Figure 4-1). The resources the school has, its policies, and other institutional factors shape the way in which school clubs and students function in that school. Further, the school is part of a school district, and functions according to policies stipulated by the district (within which the school is embedded); call it the *overarching institutional level*. Finally, the local government, the local economy, and national values are the *environmental macrosystem*, affecting the values towards education, budgetary constraints, and issues beyond the boundaries of the school-level hierarchy. So overall, students' social life in school is a complex hierarchical social system (see Figure 4-1).

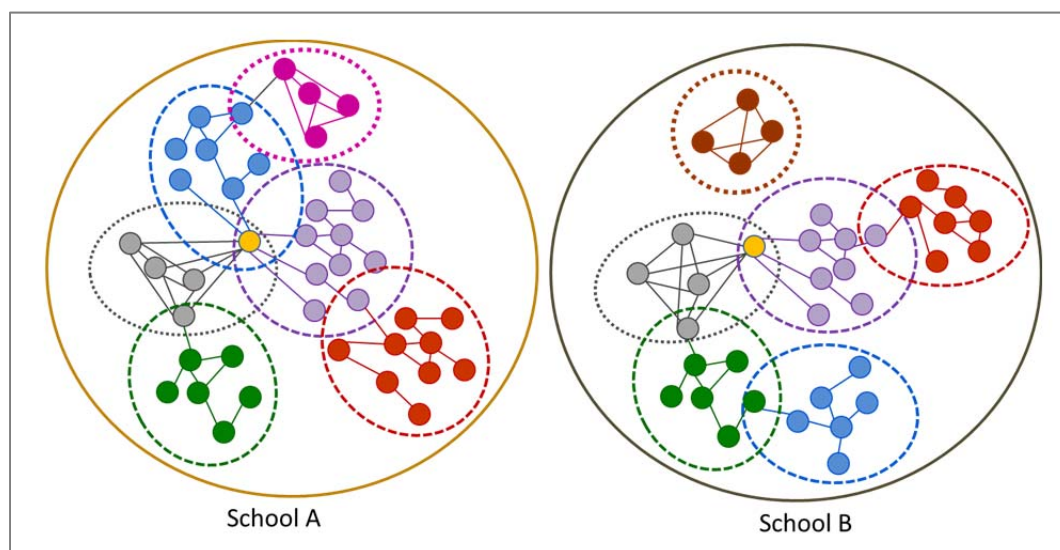


Figure 4-1. Schools as Complex Hierarchical Social Systems

In the figure above, the solid colored circles represent students. The dotted ovals represent social types to which students are affiliated (those enclosed in the ovals). At the mid-level hierarchy, we can see how social types overlap with each other, but the mid-level hierarchy could include more than one type of entity (e.g., social types and school clubs) or more than one way of examining the same entities (e.g., mediated vs. unmediated interactions). At the micro-system level hierarchy, we can see how students are interconnected to each other. At the school-level hierarchy is the school (the solid large circle), which is part of a larger macro-system of the school district and the local government.

To understand each level requires the temporary “bundling” of elements in the other levels and not paying attention to these bundles while focusing on the level chosen. How to divide the complex system into hierarchies should be determined by

the researchers studying the phenomena and the key phenomena of interest. By corollary, there are no fixed labels for each hierarchy level.

In the next chapter, I further elaborate on how I applied the framework of Hierarchically Organized Mixed Methods in my study design.

4.3. Nomothetic and Ideographic Approaches in Hierarchically Organized Mixed Methods

Using Caracelli and Greene (1997)'s design options for Mixed Methods Research, the one that my Mixed Methods Design resembles the most is the *holistic* design. In their words: "In these designs, the mixed-method tension invoked by juxtaposing different inquiry facets is transferred to a substantive framework, which then becomes the structure within which integration occurs" (p. 27). However, rather than using a framework that details specific aspects of social behavior, I am adopting a much more general framework of hierarchy as a way to organize and naturally justify the mixing of nomothetic³⁸ and ideographic³⁹ methods in one single study. At higher levels of the hierarchy, the individuals are bundled, and if the interest is in patterns of interaction between microsystems, then nomothetic approaches are more suitable. At lower levels of the hierarchy, if individuals' experiences from their point of view are of interest, then ideographic approaches are more suitable; if individuals' experiences are measured as things that can be objectively determined, and such measures are collected from a large sample of individuals to make broad generalizations, then nomothetic approaches are more appropriate. In short, at each hierarchy level, the literature and purpose of analysis will determine the type of method to use.

³⁸ Nomothetic methodologies emphasize systematic techniques, involving hypothesis testing, surveys, and quantitative methods (Burrell & Morgan, 2001, p. 6-7). Although I do not test hypothesis, I use surveys for systematic data collection, and apply quantitative techniques to visually represent the data.

³⁹ Ideographic methodologies are based on the view that "one can only understand the social world by obtaining first-hand knowledge of the subject under investigation," (Burrell & Morgan, p. 6), and places emphasis on the researcher's closeness to the subjects, and exploring in-depth the subject's background and history.

To integrate the different levels of the hierarchy different approaches can be used, depending on the way in which such integration is represented. In my dissertation, the integration is done ideographically.

In short, because “Hierarchically Organized Mixed Methods” uses a general framework of hierarchy that can be applied to diverse social phenomena, the framework is flexible to adapt to the rapidly changing socio-technical milieu. In coining the term “Hierarchically Organized Mixed Methods,” I can only claim to contribute the integration of Simon (1969/1966)’s insights on hierarchy as a strategy to organize complexity with the legitimate mixing of paradigms and methods. My hope is to provide researchers with a more readily applicable tool for identifying and integrating diverse methods.

Chapter 5. Research Design: Addressing Diverse Hierarchy-levels in a Complex Social System

5.1. Purpose of the study

Drawing on students' perceptions, I compare in this dissertation the socio-technical ecologies of two high schools. First, I examine the relationship between social types and extracurricular activities, and how social types are structured by their common association to school clubs, with the goal of revealing whether opportunities for leadership types of activities are equal. Second, based on students' labeling of their close friends' social types, I also examine how friendships are channeled across social types based on common friendships, and how such structure compares to the one based on school clubs, to assess whether close friendships are formed through school clubs and what social divisions exist. Finally, I evaluate how the channeling of friendships across social types differs when the friendship link is based on texting, instant messaging, or social network sites, with the purpose of further understanding the socio-technical affordances that enable the mediated communication with friends and thus the mediated channeling of social information across social types.

The channeling (mediated and unmediated by technologies) of friendships is based on respondents who have friends across two social types, and can be referred to as overlap, commonality, similarity, or Social Distance. I visualize the overlaps across social types to illustrate a Social Space populated by social types and assess which social types play central roles in channeling disconnected social types (with no overlap); how such centrality compares to students' perceptions of central social types and to social types involved in leadership types of activities; and whether aggregate perceptions of social types in school are related to students' self-imposed norms on participation in school clubs. Patterns and perceptions are further informed by private interviews with individual students from a wide range of social types. Findings aim at: (a) inferring socio-technical affordances that contribute to differences in friendship channeling between social types by different technologies; and (b) generating implications and ideas for resource redistribution for more equitable leadership opportunities via extracurricular activities.

5.2. Research Design: Hierarchically Organized Mixed Methods

I use the framework of Hierarchically Organized Mixed Methods, coined and described in the previous chapter. To avoid confusion, when describing my study design, I will describe the general principle behind the paradigm or methodology rather than justify the correct label for a specific paradigm-methodology mix.

To answer research question 1 (how are social types related to school clubs?) entails examining how the microsystems of school clubs and social types relate to each other. Using the hierarchy structure described in Chapter 4 (section 4.2), the hierarchical level of interest is the mid-level hierarchy (how students' extracurricular social life is organized in terms of social types and school clubs) because the outcome of interest is the network of how social types are related to school clubs. Thus, I can temporarily treat the elements in each microsystem (e.g., the students that make up the social types and school clubs) and anything at the school-level hierarchy or above as black boxes.

Table 5-1 illustrates how the goal of analysis for each research question naturally leads to selecting both a particular hierarchy level of analysis and the analysis method employed. The type of data to collect, however, may require moving temporarily to a different level of abstraction, depending on the social behavioral theory used. Continuing the example above, in Chapter 2 (section 2.3), I substantiated the importance of students' perceptions when it comes to social types in high schools, and students are elements within the microsystems that compose the mid-level hierarchy. Although I need to "drill" into these hierarchy levels to get at students' perceptions, knowing the outcome of interests and the type of data I am interested in (i.e., perceptions), enables me to temporarily ignore other aspects of the individual student (such as demographics) or aspects of the microsystems (such as which students make up a social type). Thus, the data is collected from students who are located within the microsystems, but is about the outcome of interest: how the microsystems of social types and social clubs relate to each other.

Table 5-1. Data Analysis Goals Leading to the Selection of a Hierarchy Level of Analysis

Research Question	Hierarchy Level	Analysis Goal	Data & Analysis
1. How are social types related to school clubs in terms of students' perceptions of involvement in school clubs by social types?	Mid-level hierarchy: Relationship between microsystems (<i>of social types and of school clubs</i>)	Pattern of participation in school clubs by social type	• Large N • Survey question: two school clubs describing a social type Analysis: • Two-mode network visualization of school clubs and social types • Network graph of how social types overlap based on common school clubs
2. How are social types structured based on common friendships between social types?	Mid-level hierarchy: Relationship between microsystems (<i>of social types</i>)	• Social organization or structure of social types. • Envision resource redistribution.	• Large N • Manipulation of (a) individual level relational data (friends' social types as labeled by respondents) into (b) microsystem level relational data (social types overlap) • Visualization of (b) the social organization of social types
3. To what extent does mediated channeling of friends across social types replicate the unmediated channeling between them?	Relationship between different types of microsystems in the mid-level hierarchy (<i>unmediated and mediated social organization of social types</i>)	• Social organization of social types per type of technology mediated interaction. • Infer the socio-technical affordances that contribute to differences in the social organization of social types based on mediated vs. unmediated friendship channeling • Envision resource redistribution	• Same size of N as above • Complement with findings from RQs 2 and 4 to make logical inferences
4. What additional insights do observations and interviews provide about how the socio-technical ecology in these schools contributes/ constrains students' social development? ⁴⁰	4a. From mid-level hierarchy to individuals 4b. From school-level hierarchy to individuals	Make sense of how different microsystems affect individuals' behaviors, and how individuals' perceptions help understand the peer culture in school.	• In-depth interviews with students from a variety of social types • Interpretive analysis, finding key concepts and experiences shared by respondents • Logical inference to integrate findings from all research questions

⁴⁰ For research question 4, the subquestions are: 4a. Are aggregate perceptions of social types in school related to students' self-imposed norms of participation in school clubs? 4b. How does the resource availability for school clubs affect student opportunities and participation in them?

Since the goal of my analysis for the first research question is to represent the organization or pattern of participation in school clubs by social type, I need a mid to large sample of students from each of the participating schools. I also need to use methods that can represent mid to large sets of data into a visual network. Such representation is more akin a nomothetic rather than an ideographic approach. Nomothetic approaches tend to align with epistemologies that seek regularities in explanation (such as prediction) (Burrell & Morgan, 1979), though in this case, no prediction is intended; only identification of patterns of social organization.

Similarly, for research question 2 (How are social types structured based on common friendships?), data is collected from individual students, but nomothetic techniques are used to manipulate the data so that it is ready to be analyzed at the mid-level hierarchy—examining the relationship between microsystems of social types.

Research question 3 (To what extent does mediated channeling of friends across social types replicate the social structure of social types—the unmediated channeling obtained in research question 2?) is very similar to research question 2 in terms of the data collected and how data is manipulated for analysis at the mid-level hierarchy. In addition, the same hierarchy-level (e.g., how social types relate to each other) is examined for different modes of mediated communication (e.g., texting, instant messaging, social network sites). Given my interest comparing the social structure of social types based on mediated vs. unmediated channeling of friendships across social types, both research questions 2 and 3 require medium to large samples, and nomothetic techniques to manipulate and visualize the data.

In contrast, for sub-questions under research question 4 (see footnote 40 on page 49) the goal is to make sense of how the mid-level hierarchy (e.g., relationship between social types and school clubs) affects how elements in a microsystem behave (e.g. students imposing behavioral norms based on the school club to social type organization). To get at whether students are imposing behavioral norms based on their perceptions of school clubs, it is necessary to involve two levels of analysis. Students'

perceptions of how school clubs are associated to social types is the mid-level hierarchy, whereas how students are imposing behavioral norms requires engaging closely with individual or small groups of students through observations and interviews. These are more aligned with ideographic types of approaches, and with epistemologies that seek to understand phenomena from the point of view of the participant.

Overall, using hierarchy as a framework to organize social phenomena and integrate mixed methods enabled me to choose the appropriate methods: more nomothetic ones when the goal was to examine patterns and social organization, and more ideographic ones when the goal was to understand participants' perspectives from their point of view, and examine how these were affected by the larger systems of which participants were a part. Integration of the analysis was done ideographically, by making logical inferences based on multiple data. Table 5-1 illustrates the level of hierarchy selected for each research question, and the type of data and analysis performed.

5.3. Setting: Prosperous High and Rising High

5.3.1. Access and selection of the participating high schools

Two high schools from the same school district in the Pacific Northwest volunteered for the study. As access to research sites tends to be a challenge for many researchers, and in particular for doctoral students⁴¹, I would like to point out that access to these two high schools was only possible through my advisor's connection to the participating school district's Superintendent, who put us in touch with the district's Chief Academic Officer. He recommended inviting the participating high

⁴¹ After three months of visiting high schools in one school district and pitching my research to their school principals without success, I learned that school principals tended to not be receptive doctoral dissertation research, unless it addressed evaluation issues of concern to the school district. Given the relevance of social types and school clubs to students' social and civic development, and that these are issues central to the sustenance of our civil society, the lack of receptiveness towards my research was alarming. Further, both the school district and the school principal needed to approve the researcher's presence before fieldwork could take place, and often one would not agree until they felt confident the other would agree. A similar catch-22 situation existed between the IRB and the schools. Though these are issues outside the actual research content, I bring them forward to call attention to changes and collaborations needed to help research on adolescents by doctoral students move forward.

schools based on my interest in having schools that potentially differed on how prevalent social types were in school (i.e., how much students cared about impressions based on social types, or used social types to manage their social relationships). How students interacted via technologies was expected to be similar. Most students did not carry laptops with them, and mobile phone use during class was limited given district wide technology use policies. Thus, schools were not selected based on expected differences on technology use, though as I will show in my findings, differences existed.

5.3.2. Similar demographics, different SES, architectural feel, and socio-technical milieu

I use the following pseudonyms to refer to the two schools: *Prosperous High* and *Rising High*. Although concrete data about each school's social types did not exist, the Chief Academic Officer suspected that given the differences in their socio-economic status and his knowledge about the schools, they likely differed on the prevalence of social types. Based on data from the State of Washington's Office of Superintendent of Public Instruction⁴² for the academic year prior to and of data collection (2008-09 and 09-10), the two schools were comparable in terms of class size (30 to 33 students per class) and racial diversity, though Prosperous High was ever so slightly less racially diverse than Rising High (See Table 5-2).

Table 5-2. Race Demographics from Washington State School Report Cards

School	White		Hispanic		Black/ African American		Asian/ Asian American		Native Hawaiian/ Pacific Islander		Native American/ Alaskan Native		Mixed		Other	
	08-09	09-10	08-09	09-10	08-09	09-10	08-09	09-10	08-09	09-10	08-09	09-10	08-09	09-10	08-09	09-10
Prosperous	74.9%	72.5%	7.0%	8.0%	1.8%	2.7%	14.6%	14.7%	NA	0.1%	0.4%	0.6%	NA	NA	NA	NA
Rising	70.6%	72.0%	7.5%	8.2%	4.7%	4.3%	14.2%	12.5%	NA	0.2%	1.1%	1.4%	NA	NA	NA	NA

⁴² The data comes from the Washington State School Report Cards, which provide information about K-12 public schools in Washington State, including demographic information about the students, student achievement on state-wide assessment, and information about teachers, administrators and other school staff. See <http://reportcard.ospi.k12.wa.us>

Prosperous High also had a higher socio-economic status (SES), based on the Chief Academic Officer's assessment, on the percent on free or low cost lunch and higher enrollment (Table 5-3), and on my observations and interviews with students.

Table 5-3. School Characteristics: Enrollment, Free Lunch, and Bilingual

School	Enrollment (beginning of school year)		Free or low cost lunch		Transitional bilingual	
Year	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10
Prosperous	1,405	1,446	10.0%	12.0%	1.9%	2.3%
Rising	998	949	15.6%	18.8%	1.5%	1.2%

Table 5-4. Race Demographics Based on Surveys Collected in 2009-2010

School	White	Hispanic	Black/ African American	Asian/ Asian American	Native Hawaiian/ Pacific Islander	Native American/ Alaskan Native	Mixed	Other
Prosperous <i>N = 137</i>	72.0%	7.0%	1.0%	14.0%	0.0%	1.0%	3.0%	3.0%
Rising <i>N = 178</i>	65.0%	7.0%	3.0%	12.0%	3.0%	1.0%	7.0%	1.0%

Table 5-4 shows that the race demographics I obtained from each school (mostly 11th graders or Juniors and 12th graders or Seniors, with an average age of 16.7 and 16.5 in each school) is comparable to the one reported by the state for the academic year 2009-10, with a slightly higher proportion of Pacific Islanders at Rising High than reported by the Washington State Report Cards (3.0% vs. 0.2%). Further, the Washington State Report Cards did not show data for “mixed” or “other,” though respondents in my study did report such categories in both schools (3.0% in Prosperous and 7.0% in Rising reported their race as “mixed,” and 3.0% for Prosperous and 1.0% for Rising reported their race as “other”). As interracial marriages grow, “mixed” and open ended “other” may be categories that the state needs to collect in order to facilitate research which depends on their data to assess the role of race and diversity in various social phenomena. In both the state data and my data, there were more Blacks at Rising High (4.3% in the WA data and 3.0% in my data) than at Prosperous High (2.7% in the WA

data and 1.0% in my data). This difference between both schools was also observable during my field visits.

The socio-technical milieu was very different at both schools. In terms of physical space, Prosperous had a much more polished look as it had just been remodeled five to six years prior to my data collection; whereas Rising seemed to not have been remodeled for a couple of decades. In fact, students from Rising High themselves described their school as “ghetto.” For example, Jill shared:

I guess people like to describe Rising a little bit as ghetto because the school is a little older. It’s kind of run down. We really have a mix of students who come here. So there’s the really wealthy people, but there definitely are a lot of people who come from low income housing and things like that. So, I guess that’s why they describe it as ghetto, as not being very affluent. The school’s leaking roofs, things like that... So, ghetto.

Mo also shared:

There’s a group of black kids. I mean, the school is ghetto, I guess. It’s kind of poor and run down.

In line with these students’ views about the school having a proportion of less affluent students, at Rising High, I interviewed at least three students who did not participate in school clubs due to the financial costs associated (sports require a fee, and staying after school requires students to have special arrangements for transportation), which not everyone could afford. In contrast, at Prosperous, I only interviewed one student who did not participate in clubs, but the reasons were not financial but attitudinal (anti-school activities attitude).

Rising High also houses an alternative “Choice School” which offers “credit-recovery” for students at risk of not graduating. This school operates in a small classroom environment, and has a total of anywhere from 55 to 70 students. I will simply refer to it as Choice School. Although it accepts students transferred from any school, students at Rising High are more aware of it due to its physical proximity.

Although students enrolled in Choice School are not counted in Rising's enrollment, demographic, and achievement statistics, students from both schools interact on a daily basis. Many at Rising know friends at Choice School, or have friends who have informed them of Choice School as an option for their academic situation. As Mo shared:

I know there are a lot of people in this school that go to Choice School. I think they only go there [Choice School] for a couple of classes, and they go here [Rising] for a couple of classes. I never know who is actually going there full time... but I think we all eat lunch together...

Carl, who was going to transfer to Choice School said:

Oh, it's like a different school, but it's still here... There's no homework for students in Choice School's classes and the students gain credits faster... Others would categorize Choice School as the dropout school cause that's where a lot of people that failed school go. So, that's kind of the reputation of like 'Oh, you're going into Choice School? You must be failing life or something.'

In my observation, the physical space at Rising was older and the hallways darker than at Prosperous. Due to the architectural design, there was less natural light seeping through the hallways. Both schools were well equipped with computer classrooms, within the school library and in computer labs, but based on my interviews, I was under the impression that a higher proportion of students at Prosperous were tech savvy than at Rising because at Prosperous (but not at Rising) I encountered students using the term jailbreaking (to refer to unlocking the iPhone), offering to show me how to bypass the school's security system so that I could access email and social network sites via the school network, and voluntarily shortening the URL to my survey and putting that on the board for others to use.

5.3.3. Principal and teacher cooperation: effect on permission response rates

Overall, both schools' principals, staff, teachers and students were extremely helpful, and I thank them for their cooperation. However, some differences existed in their approach, which is relevant to explaining the different numbers in students' rate of survey participation. The principal's management style may also serve to contextualize the setting and the school-level hierarchy of abstraction.

At Prosperous High, the principal tended to mandate how things were done. The principal cared about time efficiency. Based on my protocol, I had planned to interview teachers one on one. The purpose of the teacher interviews was to get an initial set of social type labels from teachers who were most familiar with students' social life in school. Both principals readily enabled me to proceed. At Rising, the principal listened and delegated. The principal put me in touch with a staff member, who forwarded my recruiting message to teachers. Teachers responded, and interviews were scheduled. At Prosperous, the principal had a more top-down management approach. The principal had already scheduled teachers deemed to be most familiar with students' social life to meet with me as a group. The principal explained to me that this would save me time, and produce better outcomes because teachers could build off one another's description of social types⁴³.

Teachers also cooperated in a very different way. At Rising, every single teacher from the courses sampled offered their class time for me to conduct my student online-survey. They also helped with the collection of parent permission forms, by allowing me to come to their classroom to introduce my research to students, let them know the survey date and time, and hand out parent permission forms. Teachers also helped send email reminders to parents. As a result, for 11 sampled courses (10 English courses and the Leadership class), 304 permission forms were sent; 193 permission

⁴³ With extensive work with the IRB, I proceeded as the principal wished, conducting focus groups with teachers at Prosperous. This did turn out to be a very successful approach, and teachers expressed feeling comfortable when sharing their knowledge of social types with me. Although data collection wise, the focus group with teachers was more time efficient than interviews, considerable time was spent with the IRB for the unexpected protocol change.

forms were returned (63.5%), with all but one (or 99.5%) giving permission; and 178 students with permission participated (i.e., 92.7% of those who had permission).

At Prosperous, parent permission forms were mailed directly to parents of students in the sampled English courses. Permission forms were handed to students from the sampled school clubs. For the English courses, the students themselves had no prior knowledge of the survey at the time the permission forms were sent. The principal did not want teachers to be involved or use class time to hand out permission forms. The principal helped by sending an email reminder to parents a week prior to the scheduled survey collection. This approach though time efficient, proved to be less effective than the approach used at Rising. For example, a parent emailed me to verify whether I was indeed conducting such research at Prosperous. Another parent wrote a note on the permission form indicating that she asked her daughter whether she would want to participate in the study. Her daughter responded that she had no idea what research study her mom was talking about, and expressed no interest. Thus, her mom signed as not consenting, and apologized to me in writing for her daughter's lack of interest. It is unclear to me whether Teachers were the ones restricting class time to academic achievement, and the principal respected that; or whether the principal put such pressure, and so teachers were less cooperative; or whether parents put pressure on teachers and the principal. Likely a combination of all of the above created the ambience of academic pressure I sensed.

In addition, out of the 11 sampled English courses, two classes backed out after parent permissions were sent, and not every teacher was willing to offer class time. Further, the response rate on permission forms was low to start with. Thus, in addition to the Leadership class, four other school clubs that provided a balance of social types were included in the sample, and parent permission forms were handed out to students in these clubs for them to take home. Even though more courses and clubs were sampled at Prosperous than at Rising (17 vs. 12), and more parent permission forms sent out (521 permission forms vs. 304 at Rising), the response rate on permission forms was much lower than Rising. 249 permission forms were returned at Prosperous, or 47.8% (vs. 193, or 63.5% at Rising), with 203 giving permission, or 82% of the

returned forms (vs. 192 or 99.5% giving permission at Rising). Of students with permission, only 137 students (67.5%) participated at Prosperous (vs. 92.7% at Rising). The lower student participation rate at Prosperous is partially because some of the permission forms returned belonged to the classes that backed out two days before the date that the survey was scheduled. Further, two of the backup classes added at Prosperous did not offer class time for the survey, and less than a handful of students showed up to the lunch periods in which I administered the survey. Table 5-5 compares the permission return rate and student participation rate at both schools.

Table 5-5. Parent Permission Return Rates and Student Response Rate

	Prosperous	Rising
Number of classes/clubs sampled	17	12
Permissions sent or handed out	521	304
Permissions returned or submitted online (percentage based on permission sent/handed)	249 (47.8%)	193 (63.5%)
Giving permission (percentage based on permissions returned)	203 (82.0%)	192 (99.5%)
Students participating (percentage based on those with parent permission)	137 (67.5%)	178 (92.7%)

The different return rates of parent permission forms confirms prior research findings (McMorris et al., 2004) comparing parent permission return rates when sent to and returned by students in their classrooms vs. sent to and returned by parents via mail. From the protection of human subjects' perspective, it also makes more sense to send permission forms home via students so that both parents and students are aware of the study. Even if students still have the opportunity to decline participation after their parents have given permission, asking students to take the permission forms home informs them that their parents will be involved in deciding their participation. Such process seems to respect students as individuals more than curtailing them when obtaining permission forms.

5.4. Data Collection

I first provide a brief overview of the data collection stages, and describe them in more detail in the next sub-sections. Data collection was done in three stages: (1) focus groups and interviews with teachers to obtain social type labels and devise a sampling plan; (2) a pilot student survey at each school, to evaluate the social type labels used, understandability of the language used in the survey, and survey length; (3) student survey, to obtain students' self-reported perceptions on social types, school clubs, friends' social types, and mediated communication with friends; (4) student interviews, to gain in-depth understanding of how students from different social types perceived the social milieu in school, and how they interacted with their friends via diverse technologies in diverse settings; and (5) observations in diverse school settings, to get a sense of how aspects at the school-level hierarchy (such as social ambience, dress-code, general cohesiveness amongst students, teacher-student interactions, student participation in extracurricular activities, etc.) contextualize the different findings in both schools, and help make sense of interviews and surveys.

5.4.1. Focus group and interviews with teachers (*Aug. 27, 2009 – Sep. 18, 2009*)

I interviewed teachers with the goal of getting an initial list of labels for social types that existed in both schools⁴⁴, and include these in the student survey described in the next sub-section. The teachers also recommended how to best sample courses to get a good cross section of 11th and 12th graders (In both schools, teachers agreed that

⁴⁴ I should note that social crowd researchers (see Chapter 2 on my choice of the term social types over social crowds) typically use a method known as Social Type Rating (Brown, 1989) to identify the social types that exist in a school (for a list of researchers using the Social Type Rating procedure, see Cross & Fletcher, 2009). The Social Type Rating procedure involves doing group interview with students identified by administrators. These students identify the major social types in each school and the "leaders" in these social type categories (i.e., students who are leading examples in the category). These leaders become candidates for small-group interviews (4 to 8 persons) in which they identify the rest of the students' social types. The data would be coded so that each student would be identified with at least one social type. I did not use this procedure for three major reasons: First, identifying all students' social types would require obtaining a school roster, and the school district would not release such information. Second, the Internal Review Board had concerns about how the identification of leaders for each social type category would result in ascertaining characteristics about them in ways that would identify them in data reporting. Third, the Social Type Ratings is process intensive, and in his manual, Brown (1989) recommends having four staff to collect the data. Given time and staff resource limitations, the Social Type Ratings process was not feasible.

since surveys were to be collected at the beginning of the fall semester, 10th graders would not have had a chance to become familiar with the social types that exist in school).

The focus group and interviews with teachers took place between August 27, 2009 and September 18, 2009 across both schools. The fall session had just started, and teacher interviews were conducted at the same time as parent permission forms were being mailed out and taken home by students.

Given the different procedures in both schools (focus group at Prosperous and one-on-one interviews at Rising), at Prosperous more teachers participated (6 vs. 4 at Rising). Further, since the participating teachers at Prosperous were recommended by the principal based on my desire to interview the teachers who were most familiar with student social life in school, the teachers at Prosperous were overall more familiar with students' social life in school than the participating teachers at Rising. At Rising, teacher participation seemed to be based on availability and response to the inquiry by the staff member (who helped me recruit teachers).

For example, on a scale of 1 to 5, with 1 being "not familiar at all" and 5 being "completely familiar", 4 (out of 6) teachers at Prosperous reported being "very familiar," or scale 4; one reported being "completely familiar," or scale 5; and one reported being "familiar," or scale 3. At Rising, 2 (out of 4) teachers reported being "somewhat familiar" with students' social life at school, or scale 2; one teacher reported being "very familiar," or scale 4; and one reported being "completely familiar," or scale 5. Nevertheless, the difference in teachers' level of familiarity with student life was not an issue because sufficient social type labels were obtained at both schools, and pilot student surveys added new labels and validated the labels teachers provided.

In terms of level of comfort with the teacher interview, overall, teachers at Rising were more comfortable with the interview procedure than teachers at Prosperous. At Rising, all participating teachers (4 out of 4) reported feeling completely comfortable with the one-on-one interview process. At Prosperous, on a scale of 1- 5

from “not comfortable at all” to “completely comfortable,” most teachers reported feeling either very comfortable or completely comfortable (2 of 6 teachers reported feeling completely comfortable or scale 5; 3 reported feeling very comfortable, or 4; and one teacher felt somewhat comfortable, or scale 2). It is unclear whether the greater variance on level of comfort at Prosperous had anything to do with the mandated focus group approach, or the focus group itself, or other factors.

Teacher focus groups at Prosperous. As mentioned, the teacher interviews proceeded differently in both schools. At Prosperous, the principal recommended teachers who were most familiar with students’ social life to participate in a focus group. Six teachers participated. I informed the teachers of the purpose of the focus group, and they had the opportunity to decline participation.

The focus group proceeded as follows:

- *Informed Consent process.* Teachers received informed consent forms prior to the focus group. At the start of the focus group, I described my study, its purpose, and the procedures for the focus group. Teachers had the opportunity to ask questions. After questions were answered, teachers had time to sign the consent forms.
- *Individual listing of social types.* I asked teachers to write down individually on the sheet of paper in front of them the social type labels that they thought existed in school.
- *Getting a preliminary list of social types for the school.* After the teachers finished their individual lists, I asked them to share what they had written, and I wrote these on a large flip chart paper. At times, a label suggested by a teacher was replaced by one recommended by another teacher, if other teachers in the room also agreed on such replacement (e.g., God squad replaced by Religious to account for social types based on different religions).

- *Reconciling social type labels with those in the literature.* After no more labels were named, I revealed on another sheet of flip chart paper a list of social type labels I obtained from research literature. I asked teachers to help me align the labels from the literature with those with which they had come up, and we finalized with a list of labels that all teachers deemed would cover all social types in school.

Table 5-6 describes the social type labels that the teachers who participated in the focus group at Prosperous High provided. These teachers had also recommended the labels Cheerleader, Leadership, Drama, and some other school clubs, which was reassuring, since it suggested that students' extracurricular activities defined their social type. However, precisely because part of my data collection would involve mapping out students' perceptions of which school clubs best described a social type, I chose to leave "club" oriented labels out, and capture them with terms like Performers (for Drama kids). In the survey, students had the opportunity to add additional social types. So, if many students added Drama kids, this label would appear in my analysis.

After the focus group, I followed up with three teachers to conduct short individual interviews, to get their opinion on what activities and school clubs they recommended me to observe; and what classes to sample for the student survey to get a good cross section of students, while minimizing sampling the same student more than once. The sampling described in the student survey section (section 5.4.3) in both schools was informed by teacher interviews at both schools.

Table 5-6. Social Type Labels from Literature and Teachers

List from literature	Prosperous	Rising	Used in pilot survey
Artsy	Musician, band, band geeks	Artsy	Artsy
Average/normal	Average	Average/normal	Average/normal
Brain	---	Brains (cool and smart kids)	Brain/smart
Druggie/smoker	Stoners, smokers	Stoner	Smoker*/stoner
---	Emo	Emo	Emo
Farmer	---	---	---
---	Gamers	Gamers	Gamer
Jock/athlete	Jocks, athletes	Jocks, athletes	Jock
Loner	Loner	Loner	Loner
Nerd/unpopular	Nerds (computer guys)	Nerds/Geeks/Loners	Nerd/unpopular
---	Overachievers	---	Overachievers
Partyer	Party kids, dirty dozen (big partyers), sluts	Party kids	Partyer
Performer	Drama kids, theater geeks	Drama	Performer
Popular	Popular kids, popular	Preppy, popular	Popular
Punker	Punks	---	Punk/rocker
---	Churchies, God squad, mormons	---	Religious
Rocker	Rocker	Rocker	Punk/rocker
Skateboarder	Boarders, skaters	Skater	Skateboarder
Thrasher	---	---	---
Tough	---	Tough	Tough
Ethnic groups	Latinos	Racial groups (black/African American, Asian American, Hispanic/Latino)	Latinos and open ended text boxes
Other school club oriented labels	ASB*, Leadership, cheerleader,	---	Open ended text boxes
Labels mentioned only once and not in any other list	Rich kids, do-gooders, sluts,	English Language Learners, Choice School kids	Open ended text boxes

* The term “smoker” instead of plain “stoner” was added by request of the school district.

*ASB stands for Associated Student Body, and is the student government that meets regularly in the Leadership class.

Note 1: in parentheses are labels that teachers had not come up with when writing on the blank sheet, but accepted after seeing my list.

Note 2: Many open ended boxes were available for students to fill in ethnic groups, or other social types not listed.

Teacher interviews at Rising. At Rising, teacher interviews were conducted privately in the teacher's office, one-on-one. I followed a similar procedure to that at Prosperous, except that the teacher being interviewed did not have anyone to discuss his/her list with at the end, and the list from literature was shown in a letter size paper rather than a large flip chart. I asked teachers to write alternative terms for the social types in this list, if any. Table 5-6 above also shows the list of social types that resulted from teacher interviews at Rising.

After comparing the list of labels provided by teachers from both schools with the list from the literature, I excluded the following labels from the literature: Farmer, and Thrasher (which refers to skateboarders, but the term was not used at the schools). Tough was included even though it did not appear at Prosperous because the teacher suggesting it taught at the Choice School, which seemed to create a different social milieu at Rising High even if students enrolled at Choice School were not counted as enrolled in Rising High.

Based on the teacher interviews in both schools, new labels added to my list included Emo (to refer to "emotional" social types, which like to wear black and listen to dark music), Gamer (to refer to computer game aficionados), Overachiever, Latino, and Religious. These social type labels were used in the student survey, for students to identify their friends' social types. In the student survey, I did not include labels that were only mentioned once. Instead, I provided six open-ended text boxes in which students could fill any label they thought was left out. In the student pilot survey and student survey, additional new labels were added: Floater, Ghetto (described in section 5.4.2), and Internet (described in section 6.2.1).

5.4.2. Pilot student survey (*Sep. 1, 2009 – Sep. 25, 2009*)

The purpose of the pilot survey was to assess: (a) whether students identified with the social type labels that the teachers provided; (b) whether students comprehended the questions as intended; and (c) the time it would take to complete the survey. I leave the details of the survey to the next sub-section, and focus here on what the pilot surveys contributed. A total of 25 students across both schools, who

were not in the sampled courses, participated in the pilot student survey. The pilot survey resulted in two additional labels: Floater (to refer to those who are not characterized by only one social type, but who float from one social type to another, depending on who they interact with) and Ghetto (used by those who saw themselves as having lower socio-economic status and life style). The label Ghetto only surfaced at Rising High. The same set of social type labels were used across both schools.

I would like to point out that prior to conducting pilot surveys at these high schools I had already tested my survey with a group of five 15 to 16 year olds to evaluate the comprehensibility of the questions and survey length. So, the pilot student survey described in this subsection was carried out specifically to test the survey with students from the participating schools.

5.4.3. Student survey (*Sep 9, 2009 - Jan. 20, 2010*)⁴⁵

The purpose of the student survey was to collect data about: students' perceptions of how social types were related to school clubs (research question 1); how social types were structured based on common friendships between social types (research question 2); and the extent to which mediated channeling⁴⁶ of friends across social types replicated the social structure of unmediated social types (research question 3). In this section, I describe the operationalization of concepts relevant to the research questions, and how such operationalization informed survey questions, the sample, and the administration of surveys.

5.4.3.1. Operationalization of key concepts

Research question 1. To collect data on whether perceived opportunities for participation in school clubs are equal for students of different social types, I asked respondents to use two school clubs to describe each social type. More specifically, the survey first asked each respondent to select the social types that existed in school,

⁴⁵ The time frame includes personal visits to ask teachers of the sampled courses for permission to use 5 mins. of their class in the near future to introduce my study, hand out permission forms, and arrange a date/time to collect permission forms prior to the scheduled survey date. These introduction and permission collection visits were done primarily at Rising High.

⁴⁶ Mediated channeling refers to technology-mediated friendship channeling. See the elaboration I provide in Chapter 1's research questions.

using the list generated from the teacher interviews and student pilot surveys. Each respondent could add up to six more social types in the open ended text boxes I provided. The social types selected (or provided) by the respondent would become the list of social types they would use to answer future questions. Then, I asked each respondent to fill in the social type that was at the center of school social life, and based on some potential confusion in the pilot surveys, I added this clarification: “The center of social life in school is NOT necessarily your social life, but that around which the most school happenings occur and overall receives the most attention.” This social type will be referred to hereafter as the “central social type.” The respondent also selected the social type in which most other people would label him/her, and will be referred to hereafter as “respondent’s social type.” For each, the “central social type” and the “respondent’s social type,” I asked each respondent to “Name two school clubs or activities in which people in the [social type]⁴⁷ are most active,” with [social type] being substituted by the “central social type” or “respondent’s social type” label selected by the respondent.

These data would be aggregated to show how social types are related to school clubs based on students’ perceptions. Relational data like this can be visualized in two-dimensional space using network visualization methods (see Appendix 5), the benefit of which is to not just see which school clubs describe a particular social type, but also whether two social types are channeled by the same school club, or whether two school clubs share connections with many social types. With some data manipulation that draws on Breiger (1974)’s framework of “Duality of Persons and Groups” (described in Chapter 3, section 3.1), the links between social types that are described by the same school clubs can provide a sense of similarity between social types based on shared school clubs/activities (see Appendix A-3.2 for the analysis method used to assess the overlap or similarity of social types based on the school clubs in which were perceived to be most active). I represent the shared common activities with linkages, and refer to the arrangement of such linkages between social types as *common activity networks*.

⁴⁷ Based on a member in my committee, teachers and student feedback, “social group” was a term that everyone would understand. So, in the survey, social group rather than “social type” was used.

Such representation can also enable to see whether based on students' perceptions, there are certain school clubs which play bridging roles, channeling students from diverse social types.

Research question 2. To collect data on how social types are organized or structured based on common friendships between social types, I first asked each respondent to name three friends with whom they spent the most time. Then, for each friend, the respondent selected the social type that best described the friend. The social types are again, those that the respondent identified as existing in school.

To get at the social structure of social types, I used the procedure described in Chapter 2 (section 2.5.2), which also draws on Breiger (1974) (see also Appendix A-3.3 for the procedures behind representing social type structure in terms of common friendships). In my study, the respondents who have friends in two social types are the common friendships that link those social types. These common friendships channel social information between the linked social types. Visually, I represent such common friendships as linkages, and refer the arrangement of such linkages between social types as *common friendship networks*. By being able to see in two-dimensional space how social types were channeled by common friendships (i.e., proportion of respondents who have friends in the same pair of social types), this analysis lends to insights on friendship and social information channeling, and the potential challenges and benefits of resource redistribution across social types.

Research question 3. To collect data about the extent to which mediated channeling of friends across social types replicate the social structure of social types found in research question 2, I asked each respondent to report the frequency with which they interacted via each of seven technologies with each of the three friends they named. The technologies are: email, instant messaging, texting, mobile phone, social network sites (like Facebook, MySpace, or other similar utility), twitter, and virtual worlds (such as online games, 3D interactive environments).

As mentioned in chapter 1, as the social structure of social types gives us a sense of how friendships and social information are channeled across social types,

mediated channeling looks at how friendships and social information are channeled across social types via different technologies. A similar data manipulation procedure is used as that for question 2, and the social structure of social types per each technology forms its own network—a microsystem of social types linked by the technology-mediated interaction that those with friendships in two social types have with these friends. In other words, the overlaps or links between social types in such microsystem represent the set of respondents who not only indicated having friends in the same pair of social types, but also interacted (on average) with these friends above a certain frequency of *interaction threshold*. These *common technology interaction networks* convey how the respondents who have friends in pairs of social types engage in the *mediated channeling* (via diverse technologies) of social information across these social types (see Appendix A-3.4 for the procedures used to represent these common technology interaction networks).

The relevance of representing social type overlaps based on common technology interactions that sets of respondents have with friends in pair of social types is that we can see the similarity of two social types based on a minimum level of frequency that exists across both social types. This minimum commonality can help understanding channeling because if there is a lot of interaction with a friend in one social type but not with the other friend in the other social type, then channeling between the social types is less likely to occur.

5.4.3.2. Sampling

Sampling was “clustered-convenient sampling.” In other words, to get a good cross section of students while minimizing double sampling students, clusters of Junior and Senior English classes of various types were sampled⁴⁸. However, instead of using random sampling within these classes, participation was determined by parent

⁴⁸ Sophomore classes were not sampled because the surveys were conducted at the beginning of the fall quarter, and teachers agreed that incoming Sophomores may not have had the time to know the social types in school. Interviews with students also verified this, with some saying that they did not notice during their Sophomore year the physical space in the cafeteria being divided by social type.

permission responses and student presence and willingness to participate on the day of data collection.

With such sampling, I do not intend to generalize to the population of high schools in the Pacific Northwest or the U.S. Rather, the schools selected are specific cases, chosen to help me understand what local forces in each school shape the conditions observed in them (Small, 2009, p. 20). Within each school, the students sampled for the survey were selected with the aim of enriching and validating the narrative behind the social structures observed in each of the two schools rather than to be the study cases. In other words, the cases studied were two schools' socio-technical ecologies, and the individual students' experiences in each school reflect that school's ecology. This is not to be confused with treating the individual student as a case, with in-depth treatment of that individual's personal experiences, and how the individual's particular situations are shaped by external force (See section 5.4.4 on student interviews for the strategy used to select interview participants).

Sample at Prosperous. Teachers recommended sampling a variety of English classes as students are required to take an English core. 11 English classes taught by 8 teachers⁴⁹ were sampled. None of the classes were AP (advanced placement) courses. I was concerned about the potential systematic bias in the sample, given that no AP classes were sampled (compared to Rising High, where 4 AP classes were sampled). Thus, I inquired about school clubs that would give me a balanced representation of social types. I distributed permission forms in four clubs: Robotics, Cheerleading, Key Club (a volunteering club), and Honors Society (to make up for the lack of AP classes). Permission forms were not sent out to every member in the club; only those present during my first visit to the club. In addition, given my interest in including students who participated in the student government, I also sampled the Leadership class (in both schools). This is a class which takes place during regular school hours, but is perceived as a school club. The time is used for student government activities, such as

⁴⁹ The principal believed that if a teacher taught more than one class on the same subject matter and level, sampling all of them would facilitate the teacher's work in matching the classes' progress.

organizing school assemblies, special events (e.g., Martin Luther King Jr. Day, Cinco de Mayo, etc.), fundraising, etc.

As I was interested in examining the unequal opportunities to take part in leadership types of activities, and students of racial minorities tend to be categorized based on their ethnicity rather than on other characteristics, I made an effort to oversample racial minorities. I approached the multicultural club and the Latinos club at Prosperous. A great proportion of members in this club spoke primarily in Spanish, and needed another student to translate my invitation to participate in the survey. Unfortunately, members of this club collectively decided to not participate in the survey, and participation of Latinos was limited to those sampled in the English classes or clubs.

Sample at Rising. The sampling strategy at Rising was designed to match that at Prosperous. 11 English-type of classes taught by 5 teachers were sampled, plus the Leadership class. As participation rate was very high in these classes, and the classes included 4 AP classes, I saw no need to also sample clubs. This was further validated by a teacher, who said that students in the clubs I was interested in sampling would have already taken the survey in the sampled English classes. The Leadership class played the same function at Rising as it did at Prosperous.

Rising did not have a dedicated multicultural club or any clubs based on student's racial or ethnic background. Based on interviews with teachers and students, I learned that the reason for not having such a club was due to the negative stereotyping associated with such clubs. Perhaps, having a more diverse student demographic shaped such decision. A student of Mexican descent shared that the reason Latinos do not hang out together is because:

We don't want to look all stereotypical or whatever, and like be in groups or whatever. So, yeah, there might be some Mexicans that act really white (Sal).

And not wanting to look stereotypical did not conflict with his “Mexican pride.” He actively discussed the Arizona anti-illegal immigration law⁵⁰ against those classmates who expressed consent for it on Facebook. In day-to-day activities, he would defend his Mexican identity through sarcasm and jokes:

I’ll say I’m Mexican about it, and that’s sometimes stereotypical from what they [my friends] expect... Just like talk with an accent or make little jokes... Maybe sometimes, but just like sarcastically or just to joke around with my friends... the whole playing to the stereotype thing (Sal).

5.4.3.3. Administration of surveys

Prior to asking students to take the survey, I checked for parent permissions, went over the informed consent (or assent) process. Those who agreed to participate were also asked to optionally provide their contact information if they were interested in being contacted for future stages of the study (i.e., an interview). The student assent data was collected separately from the student survey, to keep the survey responses confidential⁵¹. Students spent anywhere from 20 to 45 mins. to complete the survey. Students were thanked with \$5 gift cards.

Data was collected using a paid third party survey tool, which enabled encrypted survey collection via secure https.

At Prosperous, most teachers of the sampled English courses offered their class time for me to administer the survey. The online surveys were administered in a computer classroom. One teacher asked that students who had permission and were willing to take the survey be directed to the computer classroom, and the rest would stay in class with him to proceed with class. To make up for the sampling lost (the teacher that backed his two classes out), I asked the teacher if I could invite students

⁵⁰ The Arizona Senate Bill 1070, signed into law on April 23, 2010, the same month during which I conducted interviews, was actively debated in the media at the time.

⁵¹ The data was considered confidential rather than anonymous, according to the University of Washington’s Human Subject’s Division (HSD). To clarify, the survey does not contain the students’ name. However, for the interview subjects’ selection strategy described in the next subsection, a link between the student’s record and student name was maintained. In accordance to the approved IRB application, these links have now been destroyed, and student data is anonymous (i.e., is not linked to the respondent’s identity).

with parental permission to participate in the survey during their lunch periods. Lunch periods were short (20 mins. long only). So, very few students showed up, and the less than a handful who did, had to take the survey across two lunch periods.

In the sampled school clubs, Key Club and the Honors Society offered their meeting times for me to administer the survey. However, not all members showed up during meeting times, and the participation numbers per club were less than half the size of a regular class. So, they would not really bias the sample towards a particular social type. At the Robotics Club, students were busy building robots for their competition. They were also not gathered in one room, but gathered in small groups along the hallways. So, it was not possible to introduce the study to all students at once. With permission from the club's teacher, I approached the small groups one by one, handed out permission forms and explained that I will be administering surveys the next week. On the scheduled date, I asked those who were interested in participating to meet me at the computer lab, and only about 4 out of about 70 students participated. One of them was the obvious leader of the group. Deciding to participate or not was a group activity—looking at each other to see if anyone would do it. If one of them participated, the others would join. In the Cheerleading Club, the teacher suggested taking advantage of the free study time the cheerleaders had between the end of school and their practice time. The cheerleaders present were all willing to help. Many (about 5) but not all cheerleaders participated. In the Leadership class, many students had already taken the survey. So, they worked on their own projects while the rest filled out the survey.

At Rising, all participating teachers offered their class time for me to administer the survey. Students also took the survey in a computer classroom. Teachers assisted me with identifying the students who did not have parent permission, and directed them to do independent work. I also administered surveys in two lunch sessions at Rising, with only two students. The Leadership class was also very cooperative, with only less than a handful of students not participating.

5.4.4. Student interviews (Apr. 7, 2010 – Jun. 4, 2010)⁵²

Selection of interview participants. I selected interview participants with the purpose of ‘social significance’ rather than ‘statistical significance.’ (Small, 2009, p. 20). In other words, the purpose is not to generalize, but to find out what the interview participants tell about the school socio-technical milieu. As mentioned, the two high schools cases are selected and the study planned so that I can make sense of the forces shaping the narrative of the schools. The interview participants are selected, not for me to depict their experiences in detail, but to inform on the how the socio-technical ecologies in each school come to be. Since I expected that social types and school clubs both played a critical role in students’ development of senses of selves, I invited one to two students per social type to participate in the interview.

I selected interview participants from the pool of students who had already taken the student survey, and who had voluntarily chosen to provide their contact information to be potentially contacted for the interviews. I created a list of students with two to four students per social types that existed in each school; if possible with maximal variation in frequency of technology interaction as well as school club participation, race, and gender (e.g., if more than one Brain was in the pool, one would be a Latina, one a male whose main club is drama). Of these, actual participation was based on their response to my invitation to participate in the interview, and on their schedule availability. The interview participants’ self-reported social types are listed below in Table 5-7.

⁵² This time period includes preparations done prior to the actual interviews, such as coordinating with the IRB regarding the recruitment procedure, communication with teachers to inform them on the recruitment procedure, etc.

Table 5-7. Interview Participants' Self-reported Social Types

Prosperous (12 participants)	Rising (14 participants)
<i>NA, but athletes who labeled themselves as popular or Latino.</i>	2 Jock (one male, football player with mostly popular friends; one female with popular friends)
1 Partyer (female, White, in cheer and popularly known)	<i>NA, but one Floater participant had mainly Partyer and Popular friends.</i>
2 Popular (one male, White, in the school's Golf team; one female, White, next year's student president)	2 Popular (two female, both White; one in ASB and cheerleading; one is next year's president who has been homecoming princess)
2 Floaters (one female, White, cheerleader captain; one male, Asian, in band, and hangs out with Nerds and other Loners)	1 Floater (male, White; also sees himself as Brain and Jock; friendships are mainly Partyer and Populars; has been prince/king)
<i>NA, but one Asian who is also Brain</i>	3 Brain (one female, Asian; one female Latino, in Tennis; one male, White who is in drama)
<i>NA</i>	2 Average (one male, Latino, no clubs; one female, African American, in class cabinet)
1 Loner (male, White, with mild Asperger syndrome, in scouts and community rescue team)	<i>NA</i>
<i>NA, but one Asian female who is also Artsy</i>	1 Artsy (female, in drama, of mixed race, with mainly Floater friends)
1 Latina (female, president in Latino club, in soccer, mostly Latino friends)	<i>NA, but one male who is Average, and one female who is Popular.</i>
2 Asian (one female, also Brain; one female, Gamer and Artsy)	1 Asian (female, White who hangs out with Asians, into managa)
2 Internet (male, one mixed race, in the student government and Robotics; one White, in Robotics)	<i>NA, but 1 Gamer, which is a somewhat comparable social type</i>
<i>NA, but two Internet, as the school's gaming club was not active that year.</i>	1 Gamer (male, Asian, seen by others as Nerd)
1 Punk/rocker (female, White, no school clubs)	1 Emo (male, White, no clubs, appeared to be stoned during the interview)

Semi-structured interviews. In total, I conducted 26 semi-structured interviews: 12 at Prosperous, and 14 at Rising. Each interview was approximately 90 to 120 mins. long. Interviews were conducted one-on-one in either a conference room, empty office, or one of the computer classrooms. Some participants met with me after school, others during several lunch periods (as each lunch period was only about 20 mins. long). All questions were open-ended. The interview asked participants about their perceptions of social types in schools; the social types that did not mix well; what types of

activities characterized their social group; what technology practices distinguished their social type or interaction with friends; with whom (type of people) and how they used different technologies; and the reasons behind their use preferences. When possible, participants “showed me around” their website, application, social network site, or mobile phone as they spoke about these. For each 60 mins. meeting, participants were thanked with a \$5 gift card and snacks or school lunch, depending on the time of the meeting.

5.4.5. Observations (*Aug. 20, 2009 – Jun. 4, 2010*)

Observations took place throughout the 2009-2010 academic year. Their purpose is to provide a more comprehensive picture of what I learned about each of the schools from teachers, staff, and students. Many observations were unplanned and occurred during my regular visits to distribute and collect parent permission forms, administer surveys, and conduct interviews. I observed the physical space—its design and layout and how that affected social interactions and the clustering of student groups in different physical spaces; how the principals, teachers, and staff interacted with each other and with me; how students behaved in front of the teachers; students’ use of the hallways and cafeteria; students’ dress code; and students’ use of technologies during breaks.

In addition, I planned visits to events, such as football games, school-wide assemblies, assembly to announce the elected student royalty, and other school-spirit and fundraising events. I also observed after school clubs—the types of student interactions; and hung out at the cafeteria during some lunch periods.

Part III. Findings

In Part III, Chapters 6 to 10, I first describe the respondents (Chapter 6). Then, in Chapter 7, I describe why social types mattered in Prosperous and Rising High, perceptions of social divisions and central social types. Then, for research question one (Chapter 8), I visually illustrate how respondents perceived the association between social types and school clubs. I use interview data to complement the understanding of students' perceptions of social types. For research question two (Chapter 9), I illustrate how the social types of respondents' friends are organized or structured in Social Space based on common friendships between social types, or the channeling of friendships and social information across social types. For research question three (Chapter 10), I illustrate how the mediated channeling of social types per technology is similar or different to the unmediated friendship channeling, and what affords the similarities and differences.

Chapter 6. Respondents from Prosperous and Rising High

In Part II, Chapter 5, when describing the school setting, I described the race demographics of respondents from both schools. Table 5-4 showed that Rising High was slightly more diverse, both in my data, and based on the Washington State School Report Cards. Rising High had a smaller proportion of Whites, and a higher proportion of Black or African Americans, people of mixed race, and Pacific Islanders (See 5.3.2 in Chapter 5). I also described the rate of student participation on the surveys based on the response rates on parent permission forms, with higher participation rates at Rising High than Prosperous High, mainly attributable to the way in which parent permissions were handled, and on whether class time was offered to administer surveys. Then, while describing my strategy to select interview participants, I also described the self-reported social types of the interview participants. In this chapter, I describe survey respondents' other characteristics, like gender, age, grade level, and social type.

6.1. Survey Respondents' Gender, Age, and Grade Level

At Prosperous, 61 % of the survey respondents were female and 39% male, compared to 48% female and 51% male at Rising, where one respondent (1%) reported gender as "other." As only Junior and Senior English courses were included in the sampling strategy, survey respondents' age ranged from 15 to 18, with the majority of them being 16 or 17. The average age was 16.7 at Prosperous, and 16.6 at Rising. As Figure 6-1 shows, 7% of survey respondents at Prosperous were 15 years old, compared to none at Rising. This was because at Prosperous, I administered surveys during lunch periods to make up for the classes which backed out or did not provide class time. During lunch period, some respondents arrived with friends, and as long as they had parent permission, they could participate; thus the few sophomores (see Figure 6-2).

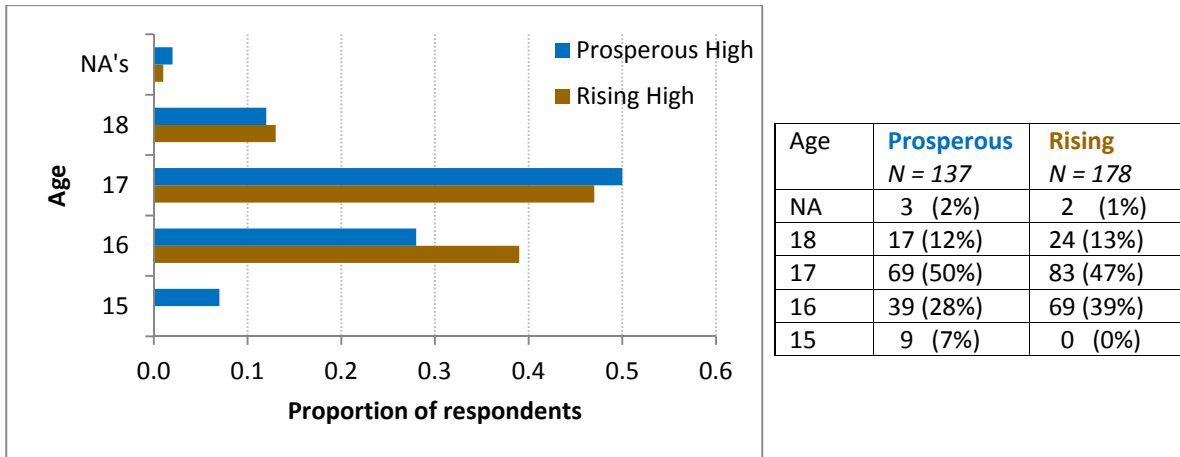


Figure 6-1. Age Distribution at Prosperous and Rising High

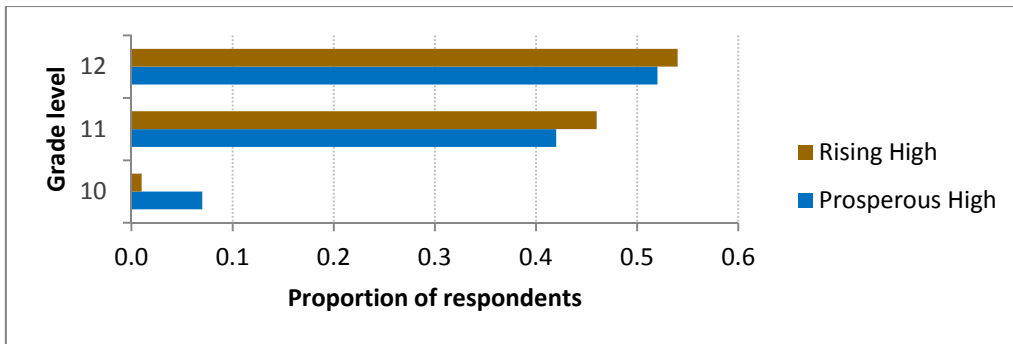
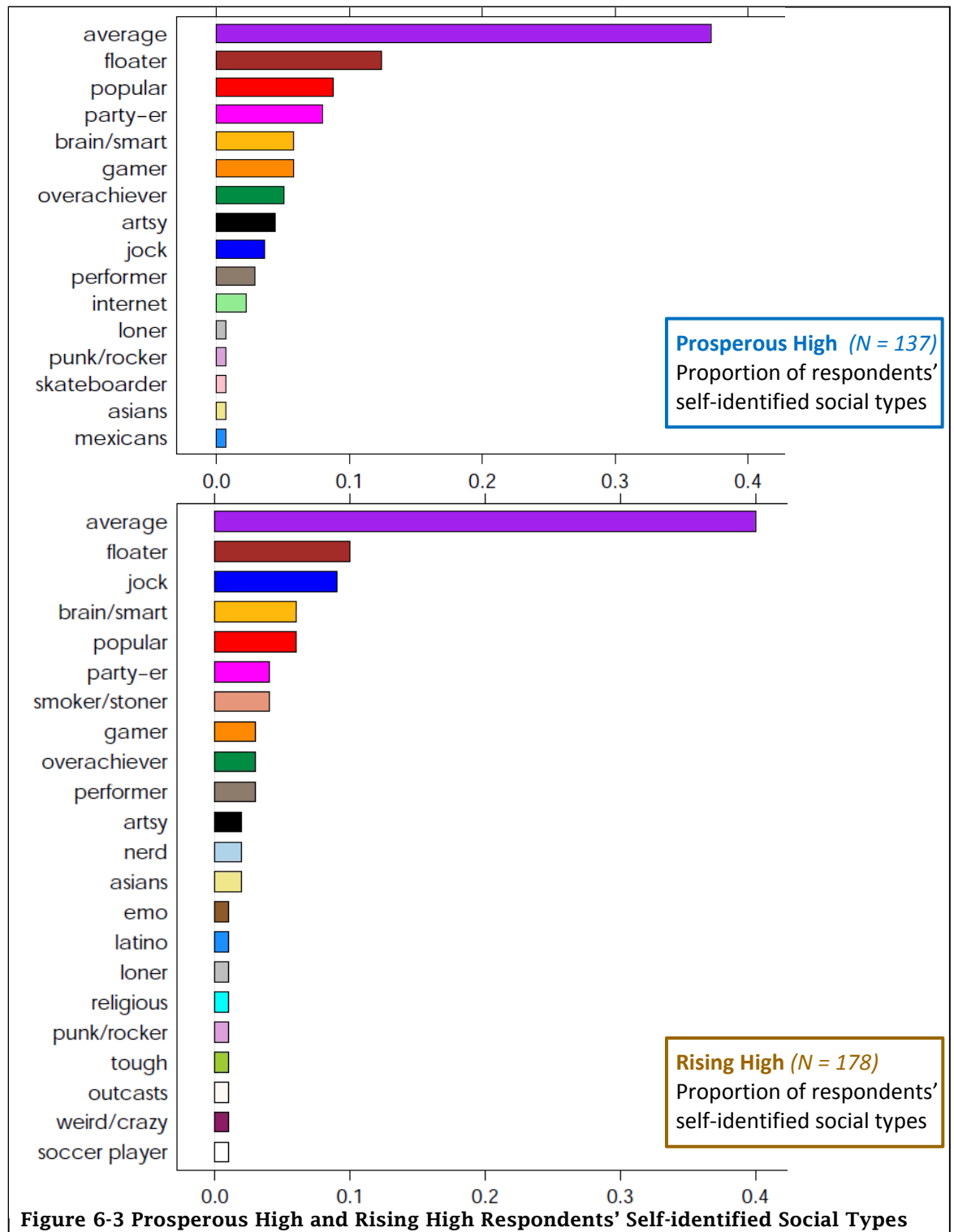


Figure 6-2. Grade Level Distribution at Prosperous and Rising High

6.2. Respondents' Social Types

Figure 6-3 shows the distribution of respondents' self-reported social types. I asked each respondent to select from the list of social types that exists in school, the one with which most peers in school would identify the respondent. In both schools, the social type that most respondents self-reported for themselves was Average and Floater. Students typically described the Average social type with terms like not outstanding, ordinary, plain, not attention seeking, average looks, social, likeable. Students described the Floater social type with terms like outgoing, flexible, travel, friendly. Thus, respondents tended to see themselves as "non-partisan" and having the ability to mingle with different people. Despite the potential integrating role that Average and Floater social types played, social divisions still existed.



6.2.1. Main social type differences between both schools.

Overall, respondents at Rising self-identified with a more diverse set of social types than at Prosperous. Looking at social types in which more than 1% of the respondents identified, we can see that at Rising, there was a higher proportion of self-identified Asians, and Loners. Surprisingly, a similar number of respondents at Rising self-identified as Smoker/stoners and Partyers; whereas at Prosperous no respondent identified as Smoker/stoner. Though this may just be an artifact of parent permissions, in Chapter 9, I provide evidence that may suggest otherwise. Another evident difference is the higher proportion of Jock respondents at Rising than at Prosperous.

In both schools there were very small percentages of respondents who identified as alternative⁵³ social types like Skateboarder, Emo, Punk/rocker. That some of these social types exist only in one school and not the other should not in themselves be taken as an indication of differences in social types between both schools. For example, based on survey responses, Emo, Tough, Religious, Outcasts, Weird, and Soccer Player respondents only exist at Rising. However, in the teacher interviews, both schools' teachers reported the existence of Emo, and the social type Religious was reported by teachers at Prosperous but not Rising. Outcasts, Weird, and Soccer Player were only reported by one respondent each. As mentioned in Chapter 2 (section 2.5.2), social types are restricted to the ones recognized by peers (Brown, 1990, p.184). Thus, the self-report by one person of a social type cannot constitute in itself a social type category. Further, although in both schools, there were very few who self-identified their social type as Mexican or Latino, the social type should not be taken as a measurement of respondents' actual race or ethnicity. In fact, there were more respondents who were ethnically Hispanic (7% in each school). So, the Mexican and Latino social type are like other social types, a social identity.

Tough and Internet. Based on the proportion of respondents reporting a social type and corroboration from teacher interviews, perhaps the only evident differences in social types between both schools are the existence of Tough at Rising only, and the

⁵³ Alternative was a term used by Garner et al. (2006) to refer to social types that exist as alternatives to the dominant and popular crowds (i.e., social types).

existence of Internet at Prosperous only. Tough was reported only by teachers at Rising, and had respondents only from Rising. Tough referred to those who engaged in street-fighting and gang-type activities, and in Chapter 9, I clarify its close connection to the “gangster wannabe” identity.

Internet was a label created by male respondents in the Robotics club at Prosperous. Since Rising did not have such a club, a parallel social type identity did not exist at Rising. Those in the Internet social type did not think that Gamer or Nerd characterized them fairly. As Ade put it:

I probably say, I’m more of an Internet person than a Gamer person. I can say it like this. My friend Tad, he’s an Internet person. My friend Chad, he’s a Gamer person. Chad has a really nice computer and Xbox and he has board games and all that stuff, but he doesn’t use the Internet. He said he could basically, if the internet wasn’t there, he’d be basically okay. He’s ignoring the multi-player aspect of direct connect... He does play with multi-player, but... He’d do a land connection before the internet. Tad’s... it’s more of networking probably. Tad’s on Facebook, LinkedIn, and he’s on Twitter. If you Google his name... because he uses that as his user name for everything too, you just get a lot of stuff about him. He’s known by a whole bunch of website makers and stuff. I’m not as much of an Internet person as he is, but I use the Internet a lot more than I game.

Internet captured the passion they had for technology and their resourcefulness in gathering what they needed via the internet to accomplish their goals. Tad, mentioned by Ade above, described the Internet as follows:

The group I would describe as Internet are the sort of people who are working on the [Microsoft game competition]. They’re the ones that we founded our little pretend company sort of thing for the Microsoft competition that’s in a few weeks... Yeah, if you go and look on our friends’ walls [on Facebook], you can go and look on the walls of most

of my friends that I know that I wouldn't describe as being [Internets], and they're fairly normal. And then you go and look at our walls and they're mainly sort of Internet references.

And their computer and Internet savviness is applied to their social relationships:

I asked a girl out to prom... I wrote a computer virus that would ask her to prom at the suggestion of one of my other friends who knows her. He said that that would be the sort of thing that she would enjoy, and so I sent her that over Facebook. Obviously, I disguised it as something else (Tad).

As mentioned, prior research suggests that when it comes to social validation and transitioning across microsystems, **perceptions** on others' social types (or others' perception of a students' social type) matter more than self-reported identities, like the ones presented in this chapter. Thus, the analyses presented in the next chapters are based on respondents' perceptions of how social types are related to school clubs or on respondents' labeling of their **friends'** social types.

Chapter 7. Social Types at Prosperous and Rising High: Social Divisions, the Student Government, and Central Social Types

In previous chapters, I established that social types are category labels that students place on peers who share similar characteristics but do not necessarily hang out together. Social types are used by students to navigate the social landscape of peers in school. Social type affiliation indicates who an adolescent is in the eyes of peers (Brown, 1990, p. 184), and can have consequences on an adolescents' social adaptation and social development in school.

In this chapter, I describe the research setting more specifically in terms of social types. I first describe how social types mattered in students' lives. For example, social, physical, and time table differences separated different social types. Then, I discuss why such Social Distance or division between social types matter for students' social development, including the development of leadership/civic or technology identities, self-esteem, and the formation of friendships. I pay particular attention to the Leadership class in both schools as it offers quintessential forms of leadership and civic engagement opportunities. My purpose in this chapter is to set the stage for answering research question 1 (how are social types related to school club activities?) in Chapter 8.

7.1. How Social Types Mattered in Students' Lives

At Prosperous High and Rising High, social types mattered. They increased the Social Distance between some social types, contributing to social division (and thus friendships), what spaces to occupy during lunch break, and the chances of being seen by characteristics beyond a students' activity involvement, socio-economic status, sexual orientation, or ethnicity. Even though during interviews, many students expressed that student groups each had their own social life and influence (at Prosperous), or that it was easy to talk to anyone (at Rising), these students were speaking in terms of their friendship groups and were not thinking globally in terms of activity opportunities for different social categories of social types. When thinking in these terms, it is the case that some student activities receive more attention (school-

wide) and more resources invested by the school in such activities (e.g., football and basketball are the sports most widely attended in both schools, and participation in assemblies and events organized by the Leadership class are often required, and receive resource support from teachers, staff, and parents, and much more attention than other activities. Thus, in this section, I examine how social types mattered. In later sections, I elaborate on which social types received more attention in school social life.

Social types and social division based on values and norms. Table 7-1 provides sample quotes on how chances for social interaction were limited by the different social norms and values held by students from different social types. At Prosperous, interviews revealed that the division seemed primarily between the really social people (with connotation for those that value looks, sports, and the social scene), and those who hold other priorities such as academics or school club activities⁵⁴.

At Rising, there was also such division, but interviewees also revealed two other types of divisions. One division was in terms of level of involvement in school-social life, such as the school spirited vs. non-school spirited (e.g., Cheer or Jock vs. Emo—see quotes 9 and 10 in Table 7-1). The difference between this division and the aforementioned division at Prosperous is the lack of involvement in any school activities or clubs by the non-school spirited types at Rising. This is not to say, however, that the division between the school-spirited vs. non-school spirited did not exist at Prosperous. Rather, if Emo represented the non-spirited, the population of Emos or Rockers (who share characteristics) was more secluded—sitting in or by the library during lunch (see Table 7-2, quote 5) and not participating in school clubs. For example, Brin, a self-identified Punk/rocker at Prosperous said:

There's something that's a complete and total turn-off for it to be a school organized club or sport... I guess it takes some of the fun out of it.

⁵⁴ I do not imply that academics and school clubs are void of social life; but typically, students referred to those who received the most attention in school-spirit events and their after parties as “really social” in “social scenes.”

Table 7-1. Interview Quotes on How Social Types are divided by Different Values and Norms

Prosperous High	Rising High
1. "Probably the Popular group of kids doesn't really mix well with... I don't even know how to describe it... I wouldn't say Drama geeks because they're not all in drama, but the kinda kids you look at and assume they were Drama geeks. So, they don't really get along... They're just completely opposite ends of the spectrum... Those are the kinds of kids that you look like and you're like 'Oh those kids are weird'... It sounds really mean, but I don't mean it in a mean way. They're the weirder kids [the Drama geeks] and they [Popular kids] just don't want to talk with them [Drama geeks]" (Rose, Cheerleader). 2. "I think some of the sports people and the really outgoing people, really socially active people, don't like our sort of group, like the Internet sort of group that I consider myself to be primarily a member of. Last year, when I was running for Vice President... there were quite a few people that came up to me and said, 'there's no way you're gonna win.... I would say maybe 40 percent of them [the sports and socially active people] I can see as not being the sort of people that would really talk to me that much. And, in our Leadership class, for example... I'd say maybe 5 to 10 percent of the people actively dislike our sort of group" (Tad, Internet in ASB/Leadership). 3. "You can't put the Partyers with... I would say the Nerds. I don't necessarily think they are Nerds; just the ones who are not as involved with the social scene, don't see their social life as being priority number one. So, of course they would clash. None of the Partiers would invite one of these kids to their party because they go: 'We don't even know who you are.' So in that sense, groups are sort of exclusive in just what they do" (Carey, Asian in band). 4. "I don't feel like I have to worship that one group, I don't see one as the center and the ones that are considered 'the group' I'm not really interested in anyway. Like I wouldn't want to be a part of the drinking scene" (May, Gamer).	5. "Nerds and Gangsters. If I were stuck in a room with a Gangster, we probably won't be talking for hours. Because I wouldn't know what he was saying and he wouldn't know what I was saying... But I don't think of a Nerd as something low of what people see me as..." (Phil, Gamer/Nerd). 6. "As far as I know there are a lot of - a lot of the people who dress like Gangsters or like that fit that category. As far as I know Drama kids don't mooch well with them. The Drama kids tend to stay... Drama kids are very, very hard core Drama kids. We refuse to do anything that has to do with drugs or alcohol, we don't smoke, it's horrible for our voices... When you're in drama everything is about drama... They're very straight edged" (Bea, Artsy in drama). 7. "The hard core like Rocker people like me, and all the Wannabe Gangsters [don't mix well]... They are violent, and I know for a fact... and they just think they are really cool cause they listen to rap [Interviewer: Do rap and rock mix?]" No (Carl, Emo). 8. "Smart people tend to be A types and really motivated people, like go getters. Your kind of slacker Partiers, the complete opposite of that... So they just don't tend to get along very well" (Jill, Average/Brain, class cabinet). 9. "They're kind of Emos and not as into school spirit, cheerleaders, and those kinds of things... On school spirit weeks, it will be wear school colors and they'll wear black to go against it... I don't really think anyone goes out of their way to make friends if they can just physically see that they're not on the same level of interest" (Val, Popular Athlete). 10. "Obviously, like it's weird for a Jock to be best friends with like an Emo kid... But there's no groups that butt heads... (Nadia, Popular). 11. "The Mormon group are very religious based around that whole thing, so other groups of people that hang out together that - I don't know - go get drunk after school don't necessarily mix with them too well, because there's like ideological differences in that" (Damon, Brain).

Perhaps their seclusion contributed to their absence from the narratives on the social types that do not mix well. Since Emos and Rockers were not in any school clubs, little if any social interaction existed with other social types for these to realize how Emos and Rockers did not mix well with them (as knowing whether two social types mix well require minimal interaction). An alternative explanation could be that Emos and Rockers at Prosperous were unlikely to get parent permission forms signed or to fill the online survey (only one Rocker participated). Even if this were the case, given the variety of social types selected for the interviews, and my observation of social life at Prosperous, I believe that the former account is a valid one.

The other social division that only interviewees at Rising reported was in terms of social conduct, such as Gangsters vs. Nerds/Drama geeks (See quotes 5 & 6 in Table 7-1), or Gangsters vs. Emo (See quote 7 in Table 7-1). “Gangster” was a social type that was only mentioned during interviews⁵⁵. Students described Gangsters or Wannabe Gangsters as follows:

I don’t think they’re Gangsters. They’re just wannabe’s... The wannabe’s are wannabe Gangsters. So, they’ll act like Gangsters... There probably would be real Gangsters if we defined a Gangster as someone that is really into rap, who likes to rhyme their words, likes to shoot people, do like hardcore drugs, and has like a pimped out car: they’ve got like grills, and just really tacky stuff... Well, they don’t really shoot people, but they are violent (Carl, Emo).

People who really listen to rap. They wear sneakers a lot, like those kind of Nike Dunk wearing kind of people, slightly baggy jeans, things like that... baseball cap (Jill, Average/Brain in class cabinet).

⁵⁵ It could be that no one from such social type returned parent permission forms, or that the label is only used by “outsiders” and Gangsters themselves would not label themselves that way. In the surveys, Tough had adjective descriptors that were closest to the interview description of Gangsters.

The additional divisions at Rising High by level of involvement in school-spirit and type of social conduct seem to validate the school district's hunch that Prosperous High and Rising High would have some differences in social types.

Table 7-2. Social Types and Physical Space in School

Prosperous High	Rising High
1. "Between every class that's where you find the popular kids... That bench and sometimes it spreads out because there's more of them. They're always there between classes. If they're skipping class, they'll be there too" (Rose, Cheerleader). 2. "During - before school a lot of the other group that I was telling you about. I don't really know what to call them [she had referred to them as Drama geeks], but they like to hang out in front of the library. And at lunch they don't sit at the table, they sit over in the corner away from the store kind of. They sit on the floor all together by the windows. So they kinda go there" (Rose, Cheerleader*). 3. "I mean, I know this is kinda being mean, but I know, like, some, like, weird kids hang out, like, they'll eat lunch in the hallways. But I mean... there's not really that much room in the lunchroom, so someone's gotta eat somewhere" (Chris, Popular). 4. I just sat with a bunch of my junior high friends. I was like 'Okay, let's just pick a table'... but then we saw that all the Latino seniors and juniors sat at that table and they told us to go sit with them a couple times. So we're like 'Okay, we'll sit there.' And it just kinda passes down... (Bell, Latina~). 5. I sit in the library, in the corner, where it's quiet with a bunch of my friends. We're kind of like - we're the circle that you see on the movies where you've got one person playing a guitar and the rest of the people are eating. That's kind of my group. Kind of chill people (Brin, Punk/rocker).	6. "So that is another thing you see, particularly if you go in the cafeteria at lunch... And it's just kind of interesting because minorities tend to sit all here. And then you have your different social groups, like Popular people, football team, they all sit up here. There definitely is almost like a physical barrier... Yeah, younger students tend to sit over here. Sophomores, juniors, yeah, that's pretty much it... Then at this table, you'll have your mix of Latinos. I guess some blacks, but there's not that many black people here. And then the Special Ed kids sit at this table. That's just where they are because it's easier to get outside... It's pretty much always been twelfth graders over here (Jill, Average/Brain, class cabinet). 7. "I guess it's just like moving up [into the twelfth graders' table]" (Val, Popular, Athlete). 8. "I don't like eating in the cafeteria because it's noisy and stuff, so we eat out in the hallway across from some juniors and then some more seniors over here" (Mo, White who claims Asian as her social type). 9. "I usually hang out in Mr. Dow's room, which is near the entrance of the school. He's a teacher who doesn't mind if a bunch of students are in there and it's just me and some friends that hang out in there and just talk about whatever" (Damon, Brain in drama). 10. "At lunch I would hang in the library a lot. And I would play cards with Vand and some other guys" (Sal, Average who is Mexican).

* Interviewees' self-reported social types are provided in parentheses with the belief that perceptions should be viewed in context and relative to other social types rather than as absolute truths.

~Note that the interview participants' race or ethnicity and/or activity involvement is mentioned if they discussed it as something that was important to their social life (e.g., affecting how they interacted with people).

Social types and division of physical space. The social distance between extremely different social types was also delineated physically. In both schools, students were able to describe in detail where different groups, identified by social type, sat regularly during lunch period (see Table 7-2). For some students, where they sat during lunch time connoted status, some of which was gained with seniority. For example, the cafeteria was very stratified at Rising High (see Table 7-2, quotes 6 & 7), and also delineated social groups at Prosperous (see Table 7-2, quotes 1, 2, 3, 4). However, not everyone glorified the cafeteria. Many go off campus after they get their off-campus pass as seniors, and some students do not like the hype inside the cafeteria (see Table 7-2 quotes 5 & 8). Others prefer engaging in quiet activities at the library or in classrooms (e.g., Table 7-2, quotes 5, 9, & 10).

Some factors contributing to the division between social types. Schedule differences, socio-economic status, sexual orientation, and race/ethnicity, also contributed to the social and spatial division of social types. For example, at Rising, the drama club took place every day after school. So, those involved in after school sports, football, or clubs that conflicted in time would not have the opportunity to be involved in the drama club. As a result, there was not much intersection between members of such clubs (see Text Box 7-1, quote 1), and more crossover between sports and band (see Text Box 7-1, quote 2).

Text Box 7-1. Scheduling Contributing to Division of Social Types

1. "Like the drama people and the sports people usually aren't together...we don't intersect as much as other groups... Scheduling... I know band is during the day, so - and jazz band is before school and then sports are after school, so it's not like - it doesn't really conflict as much as drama" (Damon, Rising).
2. "Somehow there's more crossover between sports and band... My friend Dave, he's in band and he plays soccer... Lane, she's in band. She's on the cheer team too... I would say, I'm in the Jock group and the Band group and the Nerd group as well... pretty well rounded" (Jim, Rising).

Students did agree that personality characteristics, like being funny, outgoing, and friendly were important for someone to be viewed positively popular. However, many also admitted that socio-economic status played a factor in social acceptance (see

Brin's description of social outcasts at Prosperous, Text Box 7-2, quote 1), which kids were more likely to be popular (Text Box 7-2, quote 2), and which kids had the opportunity to participate in school sports (Text Box 7-2, quote 3), which was often associated with popularity (quote 4) and leadership opportunities (Text Box 7-2, quotes 5 & 6).

Text Box 7-2. Socio-economic Status Contributing to Division and Opportunities for Social Types

1. "The dumpster dive kids. That sounds really bad to say, but there's a couple of kids who are dumpster divers, and they seriously eat out of dumpsters. They get half-eaten food that are in plastic bags, and they have no problem eating it. They're kind of punk, but they're kind of not. They are disgusting to be around. They're the roamers—nobody really wants them there... I'm not trying to be rude to them or anything, but I don't want them around either because they do have a little smell to them" (Brin, Punk/rocker from Prosperous).
2. "Like our school is not necessarily the richest school, so it's more accepting out of everybody of like the lower socioeconomic status, but I mean, it does play a role. You can see it's like the most popular kids usually have money" (Damon, Brain in Drama from Rising).
3. "Our pay for sports fee just went up this year. So it's \$275.00 now per sport... there's a cap. I think it's \$1,000.00 a family.. Yeah, if you can't afford to play the sports, that's another thing where a lot of people that are so involved in select sports and school sports... Other families may be middle class, but they spend so much money on that, they don't have a lot of money to do other things than if you were wealthier" (Jill, Rising).
4. "I mean if you play a sport then usually you're one of the more popular kids if you good at it." (Chris, Jock from Prosperous).
5. "I think the student athletes kind of run Rising... " (Jim, Rising).
6. [This year's president], "he's friends with the athletes... [Next year's president], she's Popular and Athletics" (Qi, Popular from Prosperous).

Table 7-3. Race, Ethnicity and Sexuality and Social Types

Prosperous High	Rising High
1. “She’s Asian, which pretty much automatically gets her this weird Asian clique... I think ethnicities tend to stick together, particularly Asians, just this broad sense of Asians and Indians... I think people are walking down the hallways and it’ll be like, ‘Oh, it’s just us Asians.’ Even if you’re one eighth Asian, people would be like, ‘You’re in with the Asian genes, the Asian kind of thing’ (May, Gamer of mixed race—Asian/White). 2. “So maybe that my group of friends, I don’t know, we just happen to be Asian. I mean, there’s a lot of Asians here, and so I think when people just see you hanging out with them, of course, they’re going to associate you with them. But, no, I have a lot of friends of different cultures. If you’re going for a race, not as much Asians because there’s a lot of them, as there are the Latinos. They have their Latino club, and everyone seems to just put them in one because also you never see them hanging out with other people” (Carey, Asian). 3. The Latinos Club is only for people who identify with it: “I know that they [some people who speak Spanish as their first language] don’t go [to the Latinos Club]... I honestly feel because they don’t wanna be categorized and I think it’s the same reason why they don’t sit at that table because they just don’t connect with the rest of the Latinos for some reason” (Bell, Latino).	4. “I would say that there’s a little bit of diversity issues at Rising, so there isn’t a lot of mixing with whites and minorities here, except if you fit into a different category. If you’re a minority Jock, then yeah, you fit in more with different social groups. Or if you’re pretty or if you have money, things like that kind of sets you outside the stereotype... shoots you up to at least three levels on popularity” (Jill, Average/Brain). 5. “The South American, a lot of that group hangs out together and some of the, specifically Cambodian, hang out together” (Damon, Brain). 6. “We don’t want to look all stereotypical or whatever, and like be in groups or whatever. So, yeah, there might be some Mexicans that act really white” (Sal, Average). 7. “People just aren’t really accepting here... Like it seems so on the outside but it’s really not, because I’ve had to sit in classes where people just say really bad things about other people’s sexuality and especially about peoples’ race... Very derogatory terms... when people are talking about people’s sexuality they’ll use the F word... And... when it comes to African Americans like the N word. I’ve heard a lot of people use that” (Bea, Artsy). 8. “Oh like if a guy’s sexuality seems, is a lot more frowned upon I guess within the school... Guys are like you’re gay, you need to go away and if you don’t I’ll beat... Like it’s really bad... especially the Popular people [guys]” (Bea, Artsy).

Race and ethnicity also affected someone's ability to be seen in a social type other than their race (see quotes 1 & 4, Table 7-3). Jill shared that some minorities would have higher social status if they also had other desirable characteristics, like being a Jock or being pretty (Table 7-3, quote 4), and May shared that by being mixed Asian-White, she is automatically lumped with the Asians given her Asian features (Table 7-3, quote 1). Students' sexuality was also constraining students' to participate freely in different social networks (see Table 7-3, quotes 4 & 8), which could determine their popularity (Table 7-3, quote 9) and thereby the ease of navigating the social landscape in school. This is especially the case since students' friendships determined their social ranking to some extent. As Jill (from Rising) puts it:

Sometimes your smart partiers would be numbered two or three [in ranking of popularity, one being the most popular], depending on who they're friends with (Jill).

7.2. Why Do Social Type Divisions Matter?

Social type divisions matter because they affect students' psychological wellbeing, their access to resources, self-esteem, long-term social exclusion, and the development of leadership and civic identities. How social type divisions affect students' psychological wellbeing was described in Chapter 2, where I discussed the ease of transition between micro-systems (e.g., those who identify with more than one social type would find it more distressful in schools where these social types do not overlap than in schools where the social types do overlap). Therefore, below I focus on the other reasons for which social type divisions matter.

Social type divisions affect access to resources. Burt (2001) and Lin (2008) argue that how people are interconnected to each other (i.e., the structure of a social network) can determine the conditions for access and use of resources that can be used to generate returns. If social type characteristics are contributing to how students are interconnected to each other, who can be popular, and who can take on leadership positions, then those social types which maybe more isolated or less well connected to other social types would be in disadvantageous positions to benefit from returns (like

status gaining and access to social support). Further, those who are less well connected to social support are at higher risk of experiencing long-term social exclusion (Kieselback, 2003), discussed next.

Social types, self-esteem, and long-term social exclusion. As mentioned, some social types are more likely to play central and leadership roles in the school's Leadership class, an elective class (comparable to school clubs) composed of the student government, class cabinet representatives, and other students (see section 7.3). These social types tend to have overlapping characteristics or friendships (e.g., playing successfully in highly ranked school sports, being outgoing and social, being school-spirited). Thus, highly delineated divisions between social types suggest that some social types just do not have the chance to play this type⁵⁶ of leadership roles. Leadership roles matter because they can shape a person's self-esteem (Van Linden & Fertman, 1998), and low self-esteem is associated with high risk of social exclusion from the labor market and society (Kieselbach, 2003, p. 71).

Affecting students' development of leadership and civic-identities. Youniss, et al. (1997) show that youth who participated in activities like the high school student government or community service were more likely to vote and join community organizations as adults than students who did not participate in these activities. Thus, these activities can be important for youth to develop their sense of agency and social responsibility (Youniss et al). Further, youth who were involved in service-learning projects (classified broadly) were more likely to improve their political engagement, their self-concept, and tolerance towards out-groups (Morgan & Streb, 2001), which in itself can help break the social division between social types. So, engaging high school youth in service projects would seem to be an important endeavor. Since the Leadership class organizes the most number of service projects in school, and receives school-wide attention, I elaborate on its role in both schools next.

⁵⁶ I acknowledge that school-spirited activities are not the only way to gain leadership skills, but as mentioned, the Leadership class is the quintessential form of civic engagement in school.

7.3. The Leadership Class: Led by Certain Social Types

Across the extracurricular activities, many contained some service component (e.g., Honors Society, Key Club, Cheerleading). However, none had the visibility and school-wide support as the Leadership class. Thus, I pay particular attention to which social types participate in the Leadership class as it is the quintessential representation of civic engagement during high school. Both schools had a Leadership class, which consisted of the student government, class and club representatives, and other students. The Leadership class received school wide support, and implemented the most number of service activities for the whole school, which is the immediate community for all students.

The Leadership class was called a “class” because its members met during the regular school hours, like any other class. However, the time was spent planning and implementing school activities (e.g., assemblies, fundraising events, talent shows, etc.), and was treated by students like a school club since membership was mostly discretionary. The elected student government (or ASB-Associated Student Body) and class cabinets were by default in the class, but they voluntarily chose to run for their positions.

Activities organized by the Leadership class received regular attention from all students. For example, its members broadcasted daily announcements through the school’s sound system at both schools. The Leadership class also received school-wide financial and social support. For example, most of the events organized by the Leadership class were funded by students’ ASB fees; and often, attendance was required for the assemblies organized by Leadership. Not surprisingly, in both schools, some students perceived the elected Associated Student Body (ASB) and Leadership class to be at the center of school social life (see Table 7-4).

Table 7-4. The Leadership Class: Perceived to be at the Center of School Social Life

Prosperous High	Rising High
1. If there were like a popular group around the school, I would categorize that as the Leadership because they are well known as they are the ones who run a lot of activities of the school... They are the ones who coordinate things for us, and they represent us as the student body. So, they are probably the center of the social scene (Carey, Asian). 2. You could say it's Leadership or ASB because they're the most involved, and they're the ones that talk directly to the principal and vice principal and organize who's going where to prom, that kind of thing. So I would say they would be central. I don't know if it's necessarily that they're the 'most popular' or people wanna be with them... but they are the ones that are most involved with the school (May, Gamer).	3. ASB, I think, is you'll have to be almost a combination of all the factors that would make someone popular. So you're outgoing. You most likely play a sport or are in some other heavily involved extracurricular. You're really friendly. People will talk about you (Jill, Average). 4. [Kids in the ASB/Leadership] are mostly all preppy, mostly... or Jocks... They have a campaign video, and it's pretty much a popularity contest (Dan, Jock). 5. I think a lot of them [ASB officers] are popular (Val, Popular).

The composition of the class was slightly different in both schools. In both schools, the elected student government and class cabinets (representatives from each grade level) were by default members in the Leadership class. Also, in both schools, students needed to meet a minimum GPA requirement to be in the Leadership class. The differences were in terms of the social types that composed the Leadership class. Based on interviews, it appeared that at Rising, although anyone could sign up, the Leadership class consisted mainly of Jocks (see Text Box 7-2, quote 5, and quotes below):

I mean, the Leadership class in the end ends up being the ASB officers and a bunch of mostly like Jocks... It's mostly the really popular kids, of course, who mostly are the Jocks. Like, basically, entirely Jocks, in this case, actually (Damon).

My observations and interviews revealed that a few students in the class signed up because teachers recommended that they do it to gain leadership skills. However, in my observations, these students remained peripheral to the activities in the class:

It's just a class that you can sign up for. There's no requirements or anything, because usually there's a lot of really shy people that go into Leadership to learn to develop their social skills... There's the super outgoing people that are always leading (Mary).

At Prosperous, participation appeared initially to be more balanced. For example, Lexy, who is one of the Cheerleader captains, described the Leadership class to be composed of representatives from different clubs:

The president, ASB [Associated Student Body], and then there's - this is kind of like Class Officers, there's leaders of the Latino Club or something right here, and then there's cheerleaders, and who else is there, there's Environmental Club people - just kind of like different club leaders... I feel like everyone's pretty equal. We're kinda there for different jobs (Lexy).

However, it also appeared that whether a club was represented also depended on arrangements between the club teacher and the Leadership teacher. For example, Lexy describes a strong connection between cheerleading and Leadership, and Bell shares that she is only in Leadership because the teacher of the Latinos Club put her there:

You have to get teacher recommendations and also I was on cheer. And so, it's - there's a pretty big connection between Leadership and cheer that you need some sort of... communication line kind of thing... So... there's four cheerleaders in there (Lexy, Cheerleader Captain).

The reason that I got to be in it [Leadership class] was because I'm vice president for the Latinos Club in the Latino student council up here. So

Miss Palmer [teacher for the Latinos Club] wanted to integrate more Latino students in there [Leadership] so that we can have kind of a say in what they do and have our own activities. So she kind of pulled some strings and put me in there (Bell, Latinos Club Vice President).

I think the most recognized kids are the actual ASB officer. And, me, Sandra, and Gary, which are representatives of Latinos Club and the Black Student Club... [we] were assigned to that class to make a difference, I guess (Bell).

Despite the potential differences in the Leadership class' composition in each school, popularity seemed to determine active involvement in the Leadership class. Nevertheless, interviewees' responses are their perspectives, which are relative to what portion of the school's social life they see. Thus, in the next chapter, I examine on the aggregate, which social types were most heavily linked to the Leadership class, based on how survey respondents in each school perceived the association between social types and school clubs. Before moving on to the next chapter, I first illustrate which social types were perceived to be central.

7.4. Central Social Types: Receiving the Most Attention in School Social Life

As mentioned, students perceived the Leadership class to be involved in the most number of school social events (like assemblies, fundraising, school dances, election of the student government, special holiday celebrations, talent shows, etc.), and thus its members were well known by the student body. However, as also mentioned, the Leadership is made up of diverse social types (see section 7.3). Perceptions matter, and I am interested in finding out whether a pattern exists in the social types that get the most attention in school's social life, and how such perception may be related to the Leadership class. Thus, I ask, void of an actual school club or structured activity to define centrality, "which social type is at the center of social life in school?" Hereafter, I will refer to this question/answer as the *Central Social Type*.

Here, I use “center” or “central” broadly to refer to the social space around which the most school social happenings occur, and which overall receives that most attention.

Within the quotes above was the question⁵⁷ that survey respondents answered by selecting a social type from the list of social types they identified as existing in school. I asked this question to separate notions of social types from those of school club activities. Even though students could have included a school club in the list of social types that exist in school, and thus could have selected a school club as the Central Social Type, if that were the case (and such pattern did not occur for the Central Social Type), then it would be an indication of whether students perceive the school club as a social type identity.

Figure 7-1 illustrates the proportion of respondents who selected a social type as the Central Social Type. As can be seen, in both schools, Popular was most frequently selected as the Central Social Type, with more than 30% of respondents selecting it at Prosperous and more than 40% at Rising. At Prosperous, this was closely followed by Partyer (approximately 30%); whereas at Rising, Partyer was only selected by 10% of respondents. Jocks ranked third at Rising, with more than 15% of respondents selecting it compared to ranking fourth with less than 10% of respondents selecting it at Prosperous. This suggests perhaps that Jocks received more attention at Rising. However, Jocks’ ranking in both schools does not really match prior quotes that Jocks run the school at Rising (see Text Box 7-2, quote 5 and Table 7-4, quote 4). This may be because the label connotes only its athletic qualities, and students wanted to recognize other characteristics embodied by Central Social Types. The analysis of how

⁵⁷ The actual question was: Which is the social group that is at the CENTER of social life in school? The center of social life in school is NOT necessarily your social life, but that around which the most school happenings occur and overall receives the most attention. Note that “social group” was used instead of “social type” because in teacher interviews and pilot surveys, this was the term that students could easily understand. “Social category” or “social type” was too vague, particularly for adolescents; and “social crowd,” the academic term, not comprehensible. In addition, both in the survey instructions and in person, I clarified that “students use labels to refer to other groups of students who act the same way or do similar sorts of things, even if they do not spend time together. For example, not all “jocks” are best friends with other “jocks.” For the written dissertation, I chose to use “social type” instead of “social group” to convey the notion of category without the need to clarify each time the term is used.

social types are connected to school club activities in Chapter 8 can help explain Jocks' low ranking as a Central Social Type.

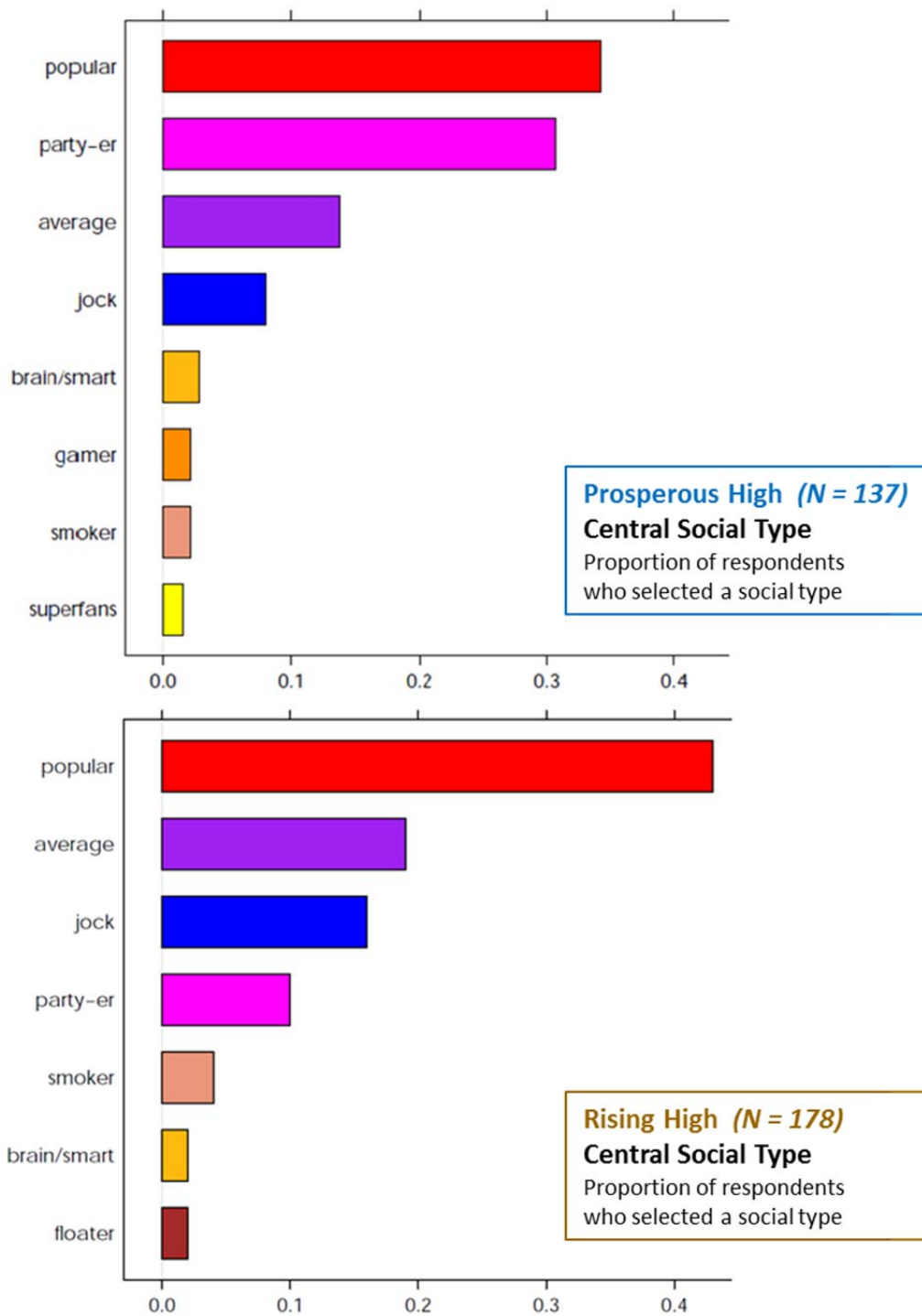


Figure 7-1. Central Social Types. Proportion of respondents who selected a social type as the Central Social Type. Only social types with a proportion larger than 1% of respondents are illustrated.

Surprisingly, the Average social type ranked third at Prosperous and second at Rising. How is it that a social type with characteristics that are not very distinguishing could be viewed as a Central Social Type? After all, students used terms like not well known, not outstanding, ordinary, and not attention seeking to describe the Average. However, this makes sense if compared to Figure 6-3, where the majority of respondents self-identified as Average. They are the majority, and thus, mathematically take up the most attention in school by numbers. Carey's reason for choosing Average as the Central Social Type captures the logic behind its high ranking as a Central Social Type:

That's like the median of the kids. You might have some of what people may regard as the losers, and then you have some that are the popular. But in the middle, the main majority are kids (Carey, Prosperous High).

Further, students also used terms like diverse, nice, tolerant, open-minded, friendly, easy-going, and terms that did not contradict each other to describe the Average; whereas the Popular, Partyer, and Jocks tended to receive both positive and negative terms (e.g., charismatic, confident, and attractive vs. egotistical, dumb, and superficial to describe the Popular). The lack of contradiction in the Average may suggest that although it does not convey leadership qualities, it is "central" to school's social life in not contributing to a divisive culture.

A few other details to note are the higher proportion of selections for Smoker as a Central Social Type at Rising compared to Prosperous; and the inclusion of Gamers as a Central Social Type at Prosperous, but not Rising. These differences, though not high in proportions, begin to paint a different picture for each school.

Chapter 8. How Social Types are Affiliated to School Clubs

In this chapter, I address research question one (how are social types related to school club activities?). My aim is to find out if students perceive activity participation by social types equally. Such perceptions are important because they may translate into self-imposed norms for participation, and thus structure participation opportunities. Such perceptions can also enable an understanding of how school clubs channel students from different social types, and how social types are similar based on the school clubs they share in common (i.e., school clubs in which respondents perceive the social type to be most active). The channeling of social types by school clubs can be useful in assessing strategies to enable participation in school clubs by diverse social types.

Thus, in this chapter, I illustrate how students perceived social types by their affiliation to school clubs, and on the aggregate (based on survey responses) which social types are associated to the Leadership class (in the students' eyes). In Chapter 7, I explained why I focus on the Leadership class, and also shared interviewee participants' perceptions of the social types that participate in the Leadership class. Along with the interviews, the survey responses presented in this chapter will enable me to paint a more holistic picture to answer research question one—at the individual level, but also at the level of how microsystems of social types and clubs relate to each other on the aggregate. One of my interests is in seeing whether as a “central” entity that governed the student body (see Chapter 7), the Leadership class played an interconnecting role between different social types and school clubs, and whether the social types directly connected to Leadership are related to students' perception of Central Social Types (i.e. social types are at the center of school social life).

Appendix 2 illustrates the school clubs or activities that survey respondents identified for social types at Prosperous and Rising High. Each survey respondent used two school clubs or activities to describe each of two social types: a) the Central Social Type, that is, the social type at the center of social life in school (see section 7.4 and Figure 7-1); and b) the respondent's social type, that is, the social type with which most

peers would identify the respondent (see section 6.2. and Figure 6.3). If the respondent's social type was the same as the Central Social Type, then, the respondent only answered the question for the Central Social Type. The school clubs or activities used to describe the central and respondent social types are aggregated to provide a sense of how social types overlap based on their common affiliation to school clubs, and a sense of how school clubs channeled different social types (see Figure 8-3 and Figure 8-4, and Appendix 2).

8.1. School Spirit/Civics Types of Activities: Closely Related to Athleticism

Since I am particularly interested in the Leadership class, and I categorized it as a school spirit/civics activity (see Appendix 2). I first compare the social types that received proportionately higher mentions of school spirit/civic types of activities to describe the social type. The school spirit/civics activities include Leadership, ASB, cabinet, cheerleading, Superfans (a role passed down each year from an elitist few that lead the crowd during sporting events), and the generic mention of school spirit. In Appendix 2, I explain why these activities are categorized in school spirit/civics activities, and how these are different from other service clubs.

As Figure 8-1 shows, in both schools, school spirit/civics types of activities were proportionately used most to describe the Popular (27/98 or 28% of its activities were of this type at Prosperous and 67/171 or 39% at Rising). At Rising, Overachiever (25%), Floater (20%), Brain (17%), and Jock (15%) followed as the social types with the next highest proportions of school spirit/civics types of activities as descriptors for the social types. Amongst social types for which school spirit/civics activities existed, Partyer ranked last, with 9% of the activities being of school spirit/civics type. In comparison, at Prosperous, Partyer ranked second with 25% of the activities used to describe Partyers being school spirit/civics. This matches survey respondents' selection of Central Social Types (see Figure 7-1). At Prosperous, Partyer had the second highest proportion of respondents (30%) selecting it as a Central Social Type vs. only 10% of respondents at Rising. Social Types with the next highest proportions of school spirit/civics activities at Prosperous were Floater (21%), Overachiever (19%), and Jock

(8%). Unlike at Rising, respondents did not use school spirit/civics types of activities to describe the Brains (which were clearly distinct from other social types due to their participation in Academic & STEM activities: 77% of the activities (see Appendix 2).

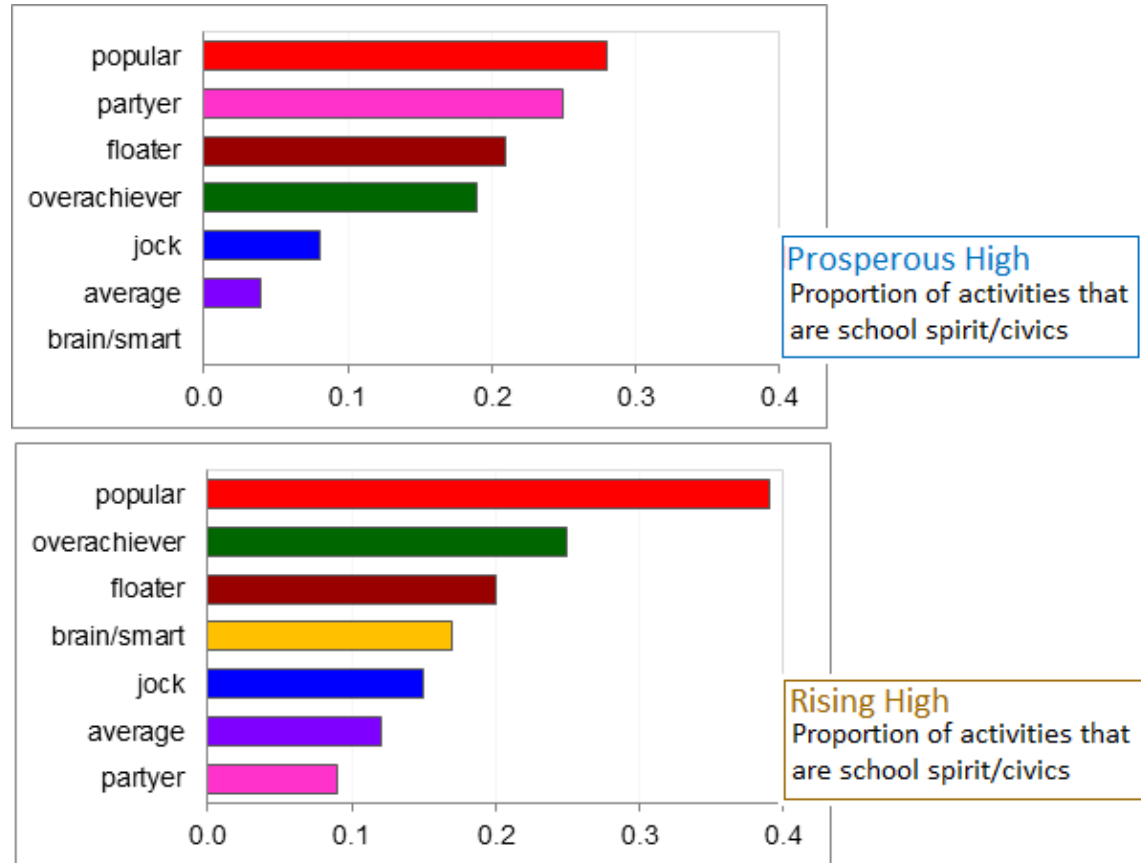


Figure 8-1. Proportion of Activities that are School Spirit/Civics per Social Type.

Of the activities used to describe a social type, this figure illustrates the proportion which is school spirit/civics. This includes being an officer in the elected student government, a class representative, a member of the Leadership class, being a Superfan, in cheerleading, or involved in school spirit activities (see also Appendix 2). Only social types for which school spirit/civics were used to describe the social type are represented. Social Types are ordered according to the rank of the proportion of school spirit/civics, with higher proportions ranking higher. No school spirit/civics were used to describe the Brain/smart at Prosperous, but the social type is included for comparison purposes.

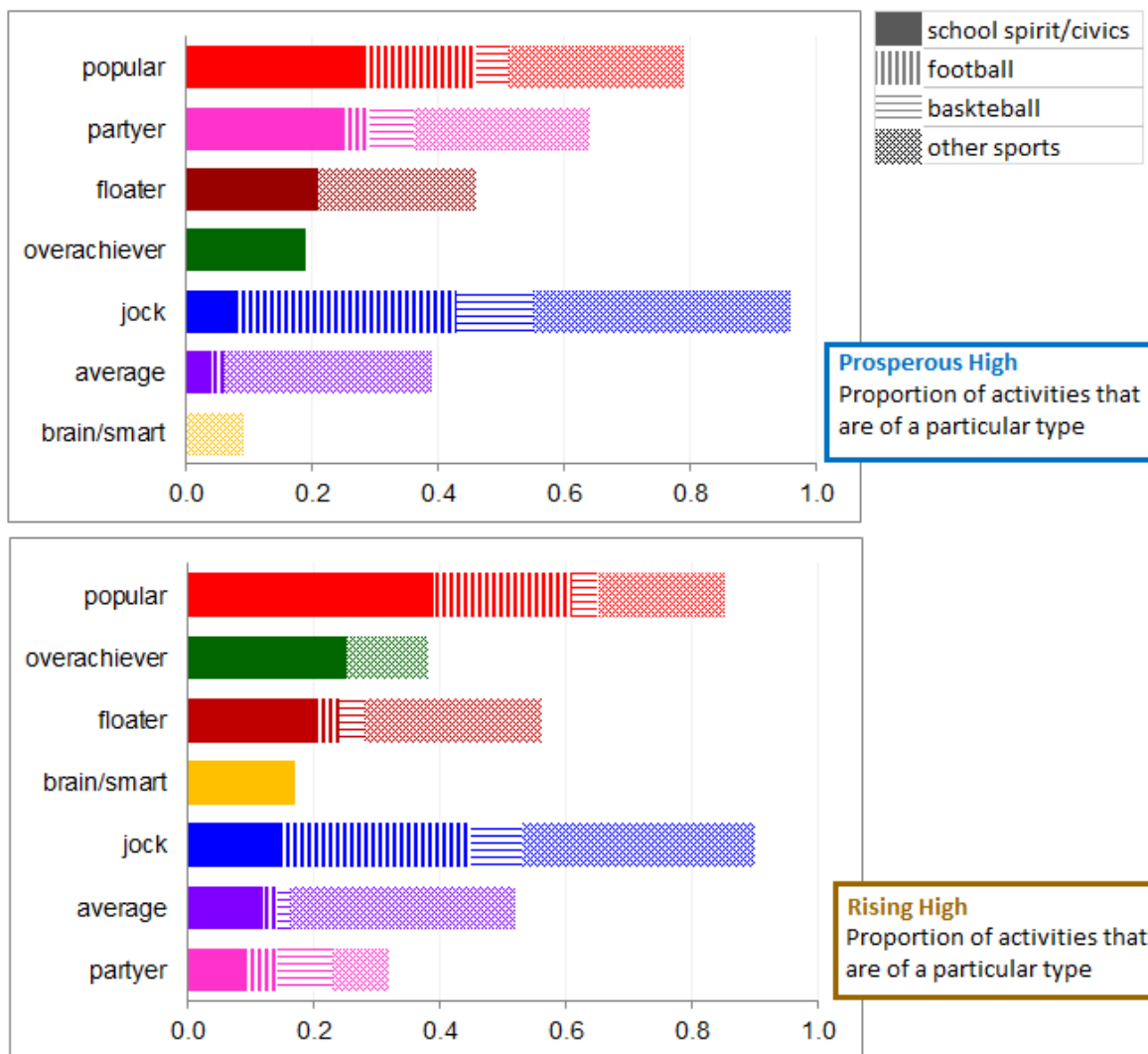


Figure 8-2. Proportion of School spirit/civics, Football, Basketball, and Other Sports used to describe each Social Type.

The same social types and order as those in Figure 8-1 are illustrated. Only proportion of activities that were school spirit/civics, football, basketball, and other sports are represented.

It may seem strange that the Jock social type ranked low in school spirit/civics in both schools when the interviews seemed to suggest that the Leadership was run by Jocks, particularly at Rising. However, when examining in more detail the activities used to describe the social types, we can see that this low ranking is only superficial. As Figure 8-2 shows, football, basketball, and other sports made up respectively, 18%, 5%, and 27% of the activities used to describe the Popular social type at Prosperous, and at Rising, 22%, 4%, and 20%. Football, basketball, and other sports were also the three major activities that described the Jocks. Thus, there is really no contradiction between

the interviews and survey data. This may also explain the lower ranking of Jock as a Central Social Type (Figure 7-1) because the Popular social type encapsulated many of the athletic qualities.

Figure 8-2 also contributes to clarifying why Partyers are viewed more centrally at Prosperous than at Rising. In both schools, the activities that characterize the Popular social type are the school-spirit/civic and sports, specifically football and basketball. These activities also represented more than 50% of the activities that described Partyers at Prosperous, but only accounted for about 30% of the Partyer's activities at Rising, which may explain why at Rising not many respondents selected Partyer as the Central Social Type. The major difference between the distribution of Partyer's activities between both schools was in the higher proportion of sports for Partyers at Prosperous (39% vs. 23% at Rising), and my inclusion of Superfans as a school spirit/civic activity. I determined that Superfans fit best under the school spirit/civics category because: (a) of its leadership characteristics; and (b) a few survey respondents identified Superfans as a Central Social Type (see Figure 7-1), which set Superfans apart from the general act of attending sport games. As Amy and other interviewees at Prosperous explained, "superfanning" is the act of wearing school colors and supporting the school teams at sports games, but Superfans refers to the few leaders who pass the title down:

... but the captains or leaders are always those five or six Jocks at the school... there's usually about six guys and six girls that kinda take charge of the whole thing... I don't know how they initially got elected. I think they just kinda did it themselves, but then it's like a tradition that it gets passed down. It's like a - it's like a hat or something. It's passed down to one person, and then they choose their group... It's like it's willed to them when they graduate (*Amy, Prosperous*).

Interviews also validated the distinction between Partyers and Populars at Rising, compared to a more similar perception of Popular and Partyers at Prosperous. For example, at Rising, some believed that the Partyers who got "trashed" (drinking) did

not mix well with the Populars who were smart and cared about school (see Table 8-1, quotes 4, 5, and 7). There was a distinction between being “school popular” and “kid popular,” which respectively refers to those involved in school spirit and the Leadership class and those who party and primarily care about getting their cigarettes or drugs (see Table 8-1, quotes 5 and 6). In contrast, several interviewees at Prosperous spoke of Partying when they referred to the Popular social type (see Table 8-1, quotes 1 and 2). In fact, May comes to the realization that there are kids who care about grades but “go trashing” anyway (Table 8-1, quote 3).

Table 8-1. The Distinction between Partier at Rising and Prosperous

Prosperous High	Rising High
1. There's the partiers who are popular for being the - you know, they're like notorious for the partying, which makes the popular in the sense that everyone knows what they do, the partying (Carey). 2. I don't know what you'd call them but I guess technically the popular kids but I don't know, they're really not that popular, they're just well known. Everyone knows them, they're the largest group of people, they're not mean or anything like that kind of popular but they're - everyone is friends with someone that's in that group and they always hang out together and they all go to parties together (Rose). 3. I don't really know. I guess it's because I don't really see them as popular. I wouldn't wanna be with them... Maybe [other kids do] yeah, that would probably be the drinking group as I mentioned. The ones that go out and party a lot... I categorize it mostly as the kids that don't really care about their grades, but will go drinking and then there's this weird category of the kids that care about their grades, but go trashing anyway (May).	4. I would say the popular smart people and the not smart partiers [don't mix well]... They probably would not be invited to the same party (Jill). 5. Rising has this weird thing where the main group, the main popular kids they seem to be the center, but I know a whole bunch of the popular kids and just everybody - a lot of people [inaudible].. at Rising, they're main thing circles around the school is kids who can get them like cigarettes (Bea). 6. The popular kids are definitely the center of the social aspect of school where it's like Team Spirit and like football and cheerleading and stuff. But when it comes to other stuff, when it comes to just like kids, it's definitely the people who sell them things (Bea). 7. Like “kid popular,” as wrong as it is, like if you go to a lot of parties and stuff, I guess you know people, and you see them, like, you can be a little more crude with your humor too, and it's just like a little more relaxed. And you can do crazy stuff and get away with it kind of thing. Whereas at school, there's like a definite line that you can't cross. I would say I am “school popular” because of ASB and stuff (Nadia).

Other things to note about the social types which survey respondents associated with school spirit/civics are that Figure 8-2 only shows the proportion of activities describing each social type that were school spirit/civic, football, basketball,

or other sports. Thus, in Figure 8-2, when these activities do not make up more than 50% of the activities that describe a social type (as in the case of Partyers at Rising), then, the activities illustrated are not representing the social type fairly. For example, 18/153 or 12% of the activities used to describe the Average at Rising were school spirit/civics activities, compared to only 4/111 or 4% at Prosperous. However, 21% of the activities used to describe the Average at Prosperous were service types of activities such as Key Club, Schools for Schools, Volunteering, etc. Whereas at Rising, perhaps given the dearth of service clubs, 11/18 or 61% of the school spirit/civics for the Average social type are cabinet activities (i.e., students who participate in the Leadership class and assist with organizing, setting up, and cleaning up events organized by the Leadership class). However, as the interview quotes in Chapter 7 show, involvement in class cabinets by the Average social type does not change students' perceptions about the social types composing the Leadership class (students at Rising perceived the Leadership class to be dominated by Jocks). This suggests that the class Cabinets are more similar to other service clubs with which the Average social type at Prosperous are described than to students' perception of the Leadership class at Rising.

Similarly, the Brain social type in both schools is primarily identified by their involvement in academics (e.g., Honors Society, STEM types of clubs, and at Rising, also in language clubs and diversity clubs). Thus, that school spirit/civics is the only type of activity represented in Figure 8-2 for Brain, only means that their main activities are not represented in Figure 8-2.

In the next section, I examine social types beyond school spirit/civics types of activities. On the aggregate, how are social types associated to school clubs, and how did such associations differ across both schools?

8.2. Social Types and School Clubs: Aggregate Perceptions

Appendix 2 provides a table of the school clubs in which social types were most active, as perceived by survey respondents in each school. This table is useful to compare such perceptions per social type across both schools. However, the long

format in Appendix 2 makes it difficult to see how school clubs channel different social types or how different social types are connected to each other by school clubs.

An alternative to representing how social types are associated to school clubs is a network view of these associations. Figure 8-3 and Figure 8-4 illustrate respectively for Prosperous High and Rising High, the Social Space of how school clubs are related to social types based on students' perceptions of the two school clubs in which a social type is most active. Each of the figures is a two-mode network view of such Social Space: one mode being social types (colored large squares), and the other being school clubs (light blue small squares). Appendix A-3.1 explains what a two-mode network is, and Appendix 5 explains how nodes in a visual network (the large and small squares in Figure 8-3 and Figure 8-4, i.e., social types and school clubs) are located in the two-dimensional space. The distances in the Social Space represented in Figure 8-3 and Figure 8-4 should not be interpreted literally because nodes' locations are optimized to prevent the crossing of lines or overlapping of nodes. The focus should be on which of the social types which are linked to the same sets of activities are located near each other.

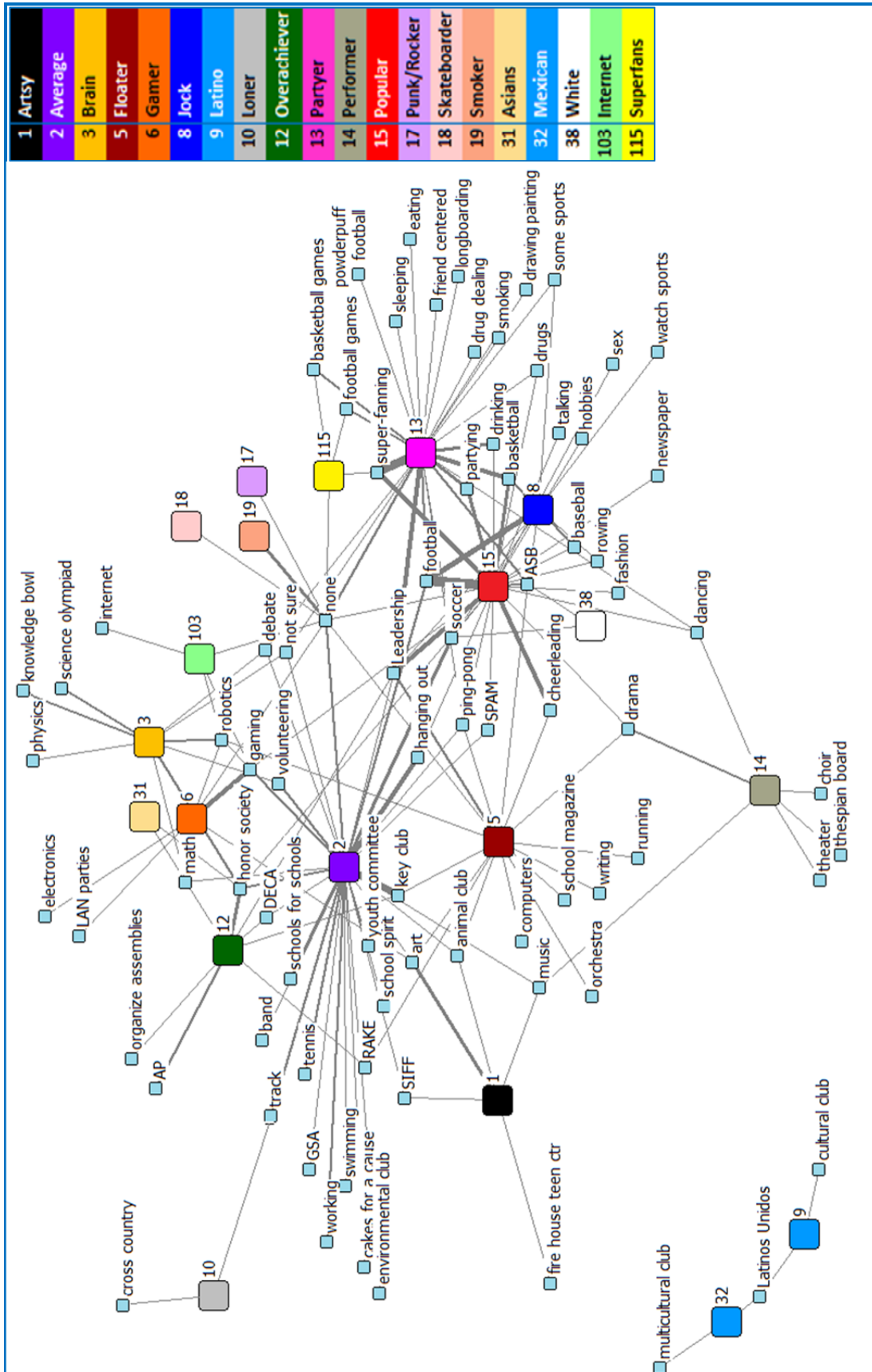


Figure 8-3. Prosperous High Respondents' Perceptions of School Clubs in which Students in a Social Type are Most Active. Colored large squares are social types. Light blue small squares are school clubs or activities. Lines connect the clubs or activities that students used to describe each social type. Thicker lines indicate a higher proportion of respondents associating the clubs/activities to the social type. Generic activities (e.g., sports, out of school sports, school clubs) are removed to enable cleaner distinctions between social types.

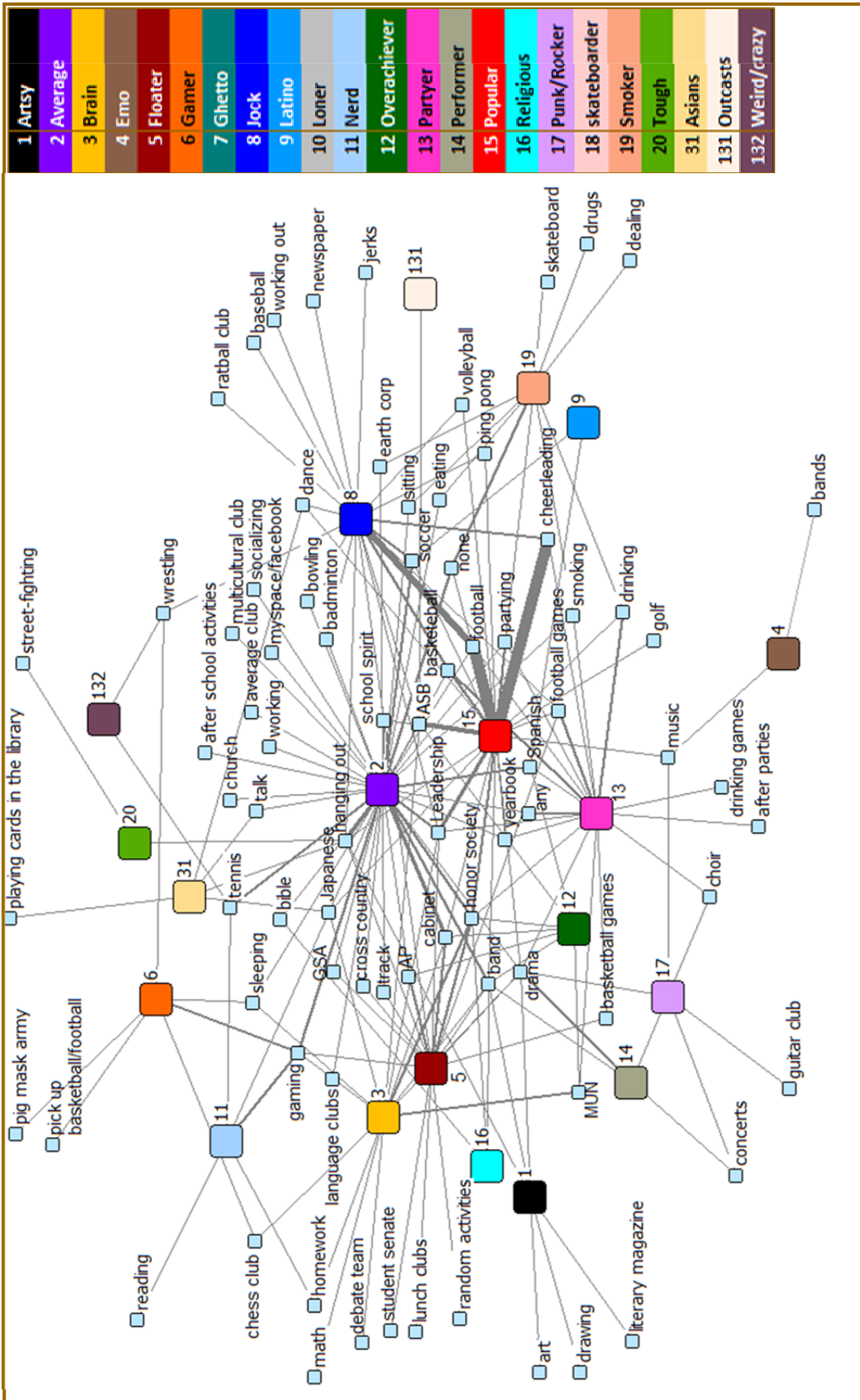


Figure 8-4. Rising High Respondents' Perceptions of School Clubs in which Students in a Social Type are Most Active.

Colored large squares are social types. Light blue small squares are school clubs or activities. Lines connect the clubs or activities that students used to describe each social type. Thicker lines indicate a higher proportion of respondents associating the clubs/activities to the social type. Generic activities like sports, n/a, any, and average club were removed. Pendant or isolate social types were also removed (i.e., Loner had no activities, and soccer player was only connected to soccer).

8.2.1. More domain-specific clubs, more evident social type clusters

Based on the Social Space of social types and school clubs for each school (Figure 8-3 and Figure 8-4), more evident social type clusters occurred at Prosperous than at Rising. At Prosperous, there was also more variety and more domain-specific school clubs than at Rising. For example, in Figure 8-3, for Prosperous High, we can see one cluster of social types: 8-Jock, 15-Popular, and 13-Partyer. They are located near each other because they share football, partying, drinking, basketball, Leadership, and ASB. Leadership is also shared with the 2-Average, 5-Floater, and 12-Overachiever social types, and ASB only with 5-Floaters. 13-Partyer and 15-Popular also share “Superfanning,” but 13-Partyers are different in that a good proportion of respondents described Partyers as engaging in activities such as drug dealing, smoking, and engaging in passive leisure⁵⁸ or unstructured activities such as sleeping, eating, friend-centered. 2-Average has, as expected, overlapping school clubs with the most social types, and distinguishes itself from other social types by the high number of service clubs used to describe it. Another important cluster of social types can be observed for the social types described with Academic and STEM types of activities (103-Internet, 3-Brain, and 6-Gamers are all linked to Robotics and Gaming). The 14-Performers are primarily identified by the theater related roles and the Drama Club, which is also a descriptor for 15-Popular and 5-Floater, though at a very small proportions. The 9-Latinos/32-Mexicans are completely disjoint from other school clubs.

The clusters are less evident in the Social Space for Rising High (Figure 8-4). Although Figure 8-4 may convey that some social types are closer to each other, the lines connecting social types to activities are more complexly interwoven, and one social type may have overlaps with many different domains of activities. One potential explanation is that there are more overlaps between school clubs on the social types perceived to engage in them. Nevertheless, we can still see that 8-Jock, 15-Popular, and 13-Partyer share the same activities as in Prosperous, namely football, basketball,

⁵⁸ Passive leisure is often described in contrast to constructive leisure (Bartko & Eccles, 2003). The former refers to unstructured activities that do not require much social or cognitive effort, such as watching TV, listening to music, hanging out. The latter refers to structured activities which are organized to provide a forum for the development of skills, talent, leadership, service, and social development.

partying, and Leadership. Interestingly, the 13-Partyer at Rising is not connected to the ASB (the elected student body) as it is at Prosperous, potentially due the differences discussed (Partyer is perceived to be less involved in school spirit/civics—Figure 8-2).

Based on Figure 8-4, no other evident clusters which share sets of domain-specific school clubs or activities can be seen at Rising, perhaps due to the less clear distinctive activities that respondents used to characterize each social type. For example, the Drama club itself, was reserved at Prosperous primarily to describe the 14-Performers (40%), with another 20% of its activities being on theatrical roles, and only 7% of 5-Floaters' activities and 1% of 15-Populars' activities being Drama. In comparison, at Rising, while 50% of 14-Performers' activities descriptors were Drama, it also described 1-Artsy (25%), 17-Punk/rocker (25%), Brain (7%), 5-Floater (2%), 13-Partyer (2%), 2-Average (1%), and 15-Popular (1%). Similarly, while 3-Brains at Prosperous were primarily described with academic & STEM types of activities (77%), 3-Brains at Rising only received 27% of academic & STEM activities, and the rest were distributed on language clubs (17%), diversity clubs (17%), arts & music (13%, with 7% being Drama), and gaming (7%).

Further, a higher proportion of social types at Rising had generic activity descriptors (i.e., did not characterize any social type in particular, such as hanging out, eating, none, etc., which I categorized in Appendix 2 as "Other"). 71.4% of social types at Rising included "Other" activities as descriptors, compared to only 45% at Prosperous. Interestingly, of the social types at Prosperous which had "Other" activities, 35% of these social types had "none" as the sole activity descriptor, compared to only 4% of social types at Rising. The lower use of "none" as an activity descriptor for social types at Rising occurred because respondents filled in many other non-school club activity descriptors. Thus, students at Rising claimed their presence in this map of school clubs even if their social type was not known to be active in any school clubs. This may have also contributed to the less obvious clusters of social types in Figure 8-4 because such unique descriptors at Rising made its social types less likely to share the same activity descriptors with other social types.

For example, although “gaming” is shared by the 3-Brain, 11-Nerd, 5-Floater, and 2-Average social types at Rising, interviewees told me that the gaming school club was actually not very active. It included board games, and video games, and without a clear focus, the club could not attract a consistent set of members. As a result, 6-Gamers are described by loose activities which a few of them tried to organize, but which do not describe any other social type. Thus the 6-Gamer social type at Rising does not cluster with other social types like it does at Prosperous. Similarly, the 20-Tough social type is described with street fighting, in itself not a school club, and thus not overlapping with other social types.

At the heart of these differences is the smaller variety of domain-specific school clubs and structured activities at Rising (24 active clubs) when compared to Prosperous (34 active clubs). Interestingly, the figures show that despite the fewer number and variety of school clubs, students at Rising more freely described their passive leisure. At Prosperous, it is as if the abundance of school clubs for every student type went hand in hand with students’ tendency to think of activities in terms of the structured school clubs. As a result, respondents at Prosperous were more likely to fill in “none” when no school club could be used to describe a social type. Once again, the data describe the cultural differences between the schools, of which I saw hints at the time of collecting parent permission forms and arranging with teachers the use of class time to administer surveys.

8.3. How Social Types are Channeled by School Clubs

The less evident clusters in Rising’s Social Space of school clubs and social types (as illustrated in Figure 8-4) when compared to Prosperous’ (Figure 8-3) could be interpreted in two ways. One is that there are more overlaps across social types on the school clubs in which they are perceived to be active. The other one, however, is that many social types have their own idiosyncratic activities, and despite a small proportion of overlap with other social types’ activities, these social types stay disconnected from other social types. To clarify which interpretation to use, I next examine visually how social types overlap based on shared or common school clubs.

I explain in Appendix 3, how the social type to school club association is converted into a social type to social type network connected by common school clubs. Two social types are connected if there are common sets of clubs or activities in which the two social types are perceived to be active by a set of respondents; and thus they are linked or channeled by such set of school clubs or activities. Thus, in Figure 8-5 and Figure 8-6, a line exists between two social types if they have common clubs or activities (i.e., a proportion of survey respondents used the same set of clubs or activities to describe the two social types, or perceived two social types to be active in the same club or activity). I will refer to such networks *common activity networks*.

I should clarify that prior to creating the visualizations in Figure 8-5 and Figure 8-6, I removed generic terms for activities (e.g., sports, school clubs, music, hanging out) and non-activity terms (e.g., none, other, not sure, n/a, any) that survey respondents used to describe social types. This made sense because if my purpose is to see how school clubs or common activities channel social types, these activities need to be fairly structured so that the students participating actually share the activity in some way—in some Social Space. Terms like “sports,” and “school clubs” can describe a range of activities so widely different that they do not overlap in time, space, or members, and thus cannot perform the channeling of which I am interested.

As there are less social types than school clubs, the chances are that two social types are channeled by some school club or activity (unless the social type is not perceived to engage in any activity at all, like the 19-Smokers at Prosperous). As Figure 8-5-a and Figure 8-6-a show, in both schools, many social types are perceived to be active in the same sets of clubs; thus the networks of social types, linked by their common sets of school clubs or activities, are highly interconnected.

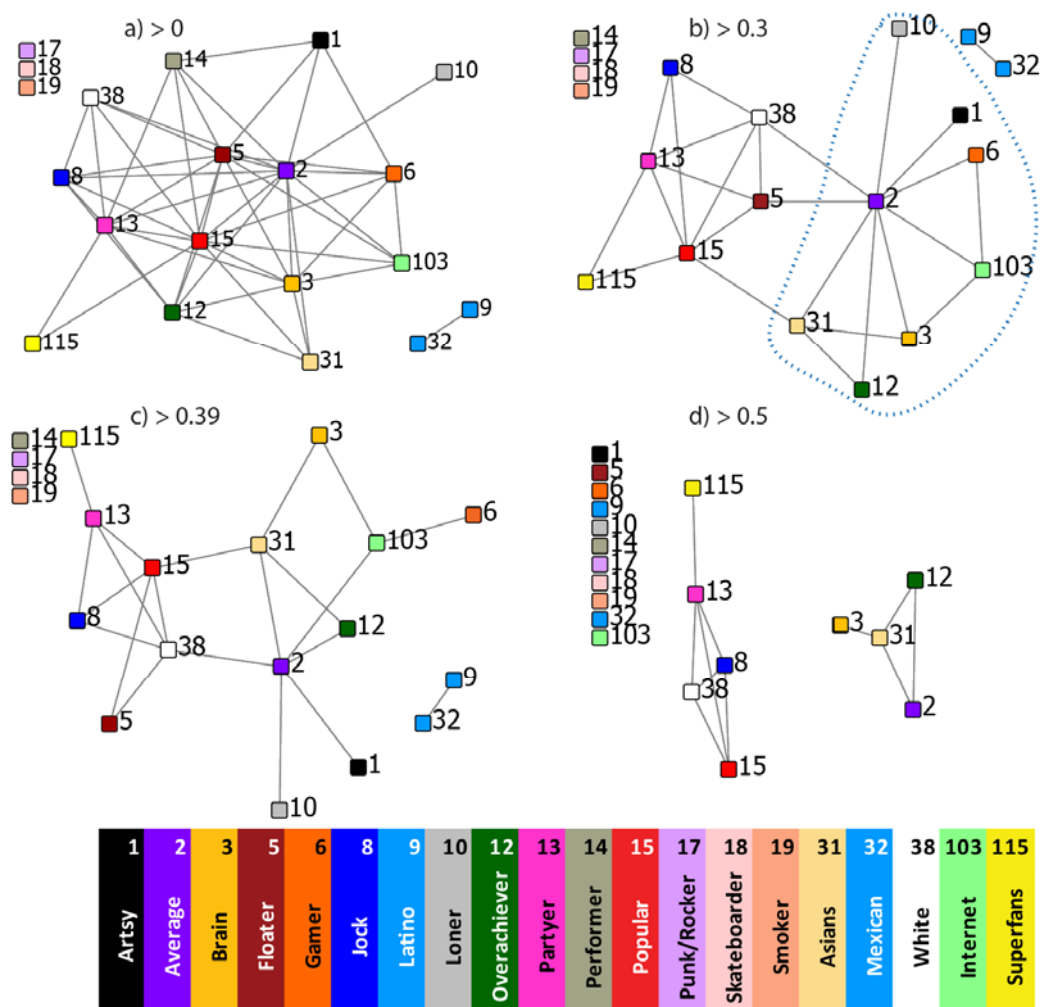


Figure 8-5. Prosperous High's Common Activities Network: Social Types Channeled by School Clubs or Common Activities Network, as Perceived by Survey Respondents.

Two social types are connected by a line if they have common clubs or activities (i.e., a proportion of respondents used the same club or activity to describe the social types). The more number of common activities two social types have the higher the value of their connection or link. In the figure above, only links above a proportion threshold are retained, to help clarify which social types overlap more by the higher proportion of common clubs. The proportion thresholds are displayed on the upper left corner of each network graph. Generic terms that do not describe any one social type in particular were left out, including none, not sure, out of school sports, and school clubs. Circled with blue dotted lines are social types involved in STEM and academic types of activities.

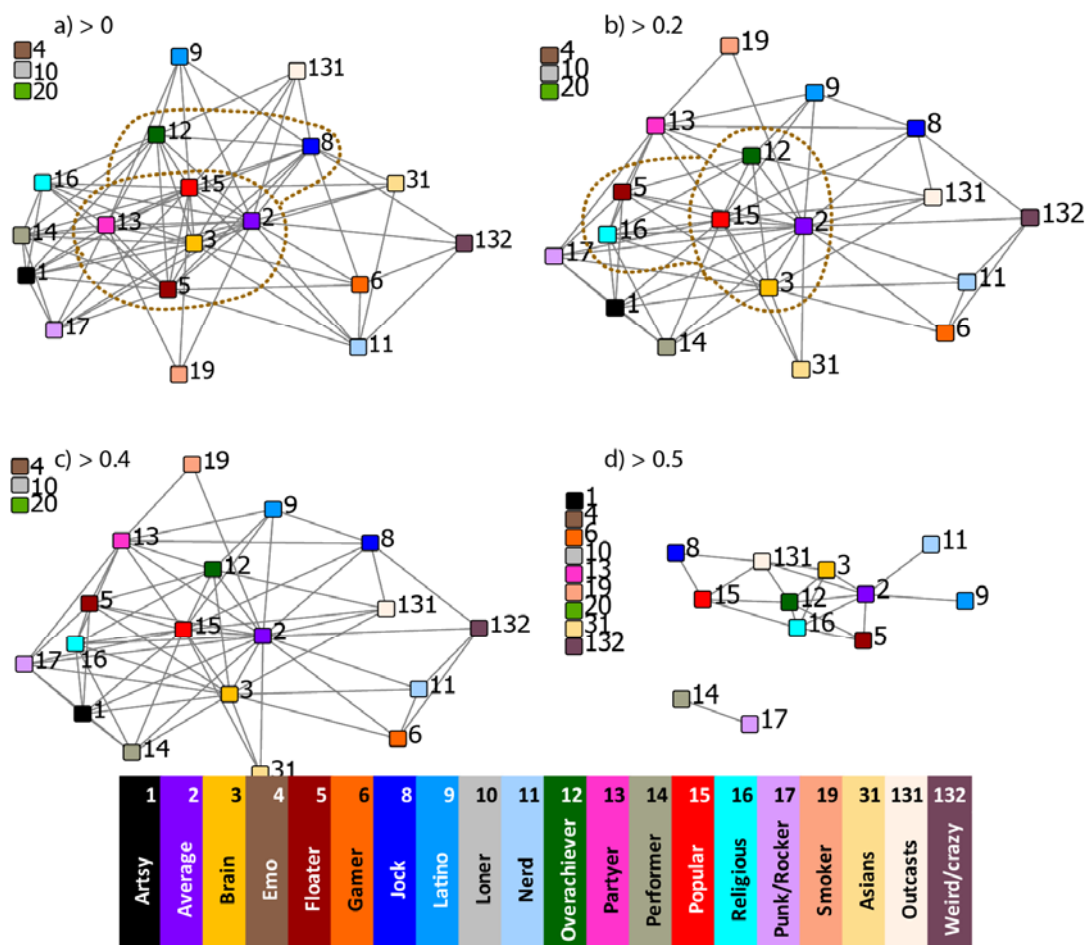


Figure 8-6. Rising High's Common Activities Network: Social Types Channeled by School Clubs or by Common Activities, as Perceived by Survey Respondents.

Two social types are connected by a line if they have common clubs or activities (i.e., a proportion of respondents used the same club or activity to describe the social types). The more number of common activities two social types have the higher the value of their connection or link. In the figure above, only links above a proportion threshold are retained, to help clarify which social types overlap more by the higher proportion of common clubs. The proportion thresholds are displayed on the upper left corner of each network graph. Generic terms that did not describe any one group in particular were left out including any, n/a, none, not sure, average club, sports, hanging out, and music.

Circled within dotted brown lines are social types that are more densely interconnected amongst themselves than with other social types outside the delineated lines. Double ovals are provided, one based on visual closeness, the other based on the calculation of factions or subgroups based on density (for density's definition, see Footnote 59 on next page).

8.3.1. A more inclusive Leadership class or a more serious center-periphery division?

As expected, even after removal of these generic descriptors, social types were more interconnected at Rising (Figure 8-6) than at Prosperous (Figure 8-5). The network density⁵⁹ (i.e., how interconnected with each other the social types are) at Rising is .17 with an average degree of 3.6, whereas at Prosperous, the network density is .1, with an average degree of 1.9. This means that overall, at Rising, there are more social types interconnected to each other by sets of common school clubs shared by social types. This can be observed by the larger number of lines coming out of each social type when compared to those at Prosperous. Although this verifies my prior speculation that many school clubs are describing the same set of social types, Figure 8-5-a and Figure 8-6-a do not clearly convey how social types cluster according to the school clubs and activities in which they are perceived to be most active; particularly Figure 8-6-a. Thus, I apply DeJordy, Borgatti, Roussin & Halgin (2007)'s method of visualization⁶⁰ to help reveal which social types are more closely related based on the strength of their connection (i.e., a higher proportion of respondents used the same set of school clubs to describe a pair of social types).

To explain what is involved in the visualization approach by DeJordy et al., I first provide a high level description of the data I used. In my data, the more number of respondents use the same school club or activity to describe two social types, the higher the common value of the connection or link between these two social types. These values are summed across clubs for each pair of social types to create the total value of the link. The link values between social types are normalized to represent proportions (see Appendix 3). The higher the value of a link, the more similar two social types are by the proportion of common sets of school clubs that describe the

⁵⁹ Network density refers to how interconnected nodes in a network are. It is obtained by the total of all ties or links that exist in the network divided by the number of possible ties in the same network. Degree refers to number of links going out of a node. Thus, average degree is the average of such measure across all nodes. In the common activities network, network density indicates how much overlap exists amongst all social types based on shared activities.

⁶⁰ This method was chosen as the graph layout algorithms DeJordy et al use do a good job of communicating the structure of multidimensional data.

pair. Thus, following DeJordy et al.'s procedure, only links above a proportion threshold are retained, to help clarify which social types overlap more.

As Figure 8-5 shows, as the proportion threshold increases, the less links remain, and the more evident the social structure is on how social types are interconnected by school clubs or activities. Although social types at Rising are initially more densely interconnected, we can still see from the get go some obvious clusters, that were not as evident in the two-mode graph in Figure 8-4. This clarity is gained because any school/club or activity which was not shared between two social types no longer play a role in the graph.

For example, we can immediately see that in Figure 8-6, 4-Emo, 10-Loner, and 20-Tough do not share any activities with other social types (after their generic activity descriptors were excluded for logical reasons). At threshold > 0.3 (Figure 8-6, b), we can see that 15-Popular, 2-Average, 3-Brain, 5-Floater, and 12-Overachiever are highly interconnected because they share many clubs/activities, including ASB, Honor Society, Leadership, cabinet, and some sports (though not all clubs are common to all of the aforementioned social types). We can also see that 6-Gamer, 11-Nerd, and 132-Weird are separate from the rest of the network, and although 31-Asian has common friendships with 2-Average, 3-Brain, and 15-Popular, it is not densely connected to the social types to which these three are connected. 19-Smoker is also isolated (except for its overlap with 2-Average, but Average overlaps with most any social type, rendering the overlap between 2-Average and 19-Smoker not as meaningful).

As the threshold increases to > 0.5 at Rising (Figure 8-6, d), we can see that 15-Popular and 8-Jock are not surprisingly connected and distinct from the other clusters due to their common connection to various club/activities such as football, basketball, cheerleading, ASB, and Leadership; again, verifying prior observations of the similarities between these two social types in respondents' eyes. We can also see that 12-Overachiever, 3-Brain, 16-Religious, 5-Floater, 2-Average, and 131-Outcast are connected one way or another via one or many of the following activities: AP, cabinet, honor society, Leadership, and ASB. 131-Outcasts also share activities with 8-Jock and

15-Popular. In fact, it is via the 131-Outcast or 15-Popular that the 8-Jock remain connected to this network graph. Based on Figure 8-4 and Appendix 2, we can see that the common activity between the 131-Outcast and its neighboring social types in Figure 8-6, d is ASB. However, the reason that the link proportion value between the 131-Outcast and other social types is high is because there was only one respondent who identified as an Outcast. Since there is too little information to confirm that there are other Outcasts in the ASB, or how well integrated they are in the ASB activities, I cannot conclude that the ASB at Rising is inclusive of diverse student types.

At Prosperous, Figure 8-5 does not provide much more new knowledge from what was already learned from in Figure 8-3 (the two-mode network graph of social types' association to school clubs). As already discussed when comparing Figure 8-3 and Figure 8-4, social type clusters at Prosperous are more evident and are characterized by distinctive activities. For example, in Figure 8-5, b, the diversity clubs cluster exists via the 9-Latino and 32-Mexican in the upper right of the graph. To the right of the 2-Average social type, academic & STEM activities cluster (103-Internet, 6-Gamers, 3-Brain, 12-Overachievers, and 31-Asian). To the left of the 2-Average, school spirit/civics types of activities cluster (15-Popular, 13-Partyer, 8-Jock, 38-White, and 115-Superfans), but some of the social types in this cluster are also linked by their engagement in drinking and drugs (e.g., 15-Popular and 13-Partyer). At the top, 10-Loners are not interconnected to other social types except to the 2-Average via track. 14-Performers were initially linked to 1-Artsy via their common interest in music, and to 5-Floaters and 15-Populars via Drama, but such links were quickly lost at the 0.3 proportion threshold. Thus 14-Performers join the set of isolates on the upper left corner, which do not share common constructive activities with other social types. (Other isolate social types positioned at the upper left corner are: 17-Punk/Rocker, 18-Skateboarder, and 19-Smoker). This suggests that 14-Performers were on their own a separate social type purely characterized by the Drama Club.

Two interesting differences are worth further discussion. First, At Rising even at high proportion thresholds (> 0.5), 131-Outcast and 12-Overachiever remained connected to the Popular via the ASB; whereas at Prosperous, Overachievers are not

connected to the school spirit/civics cluster by proportion threshold > 0.3 , and the other social types connected in this cluster at Prosperous are by nature school spirited (e.g., 115-Superfans), viewed centrally (e.g., 13-Partyers), or not providing any diversity (e.g., 38-Whites). Second, the 9-Latino at Rising is characterized via a sport (soccer) and a language club (Spanish), potentially enabling it to remain linked to other social types via these general purpose clubs. In contrast, the 9-Latino at Prosperous is characterized by diversity clubs (the Latino and the Multicultural club). Again, the more distinctive and domain-specific clubs at Prosperous seems to have segregated the 9-Latino social type.

However, once the composition of the clusters and the potential segregation indicated in Figure 8-5 and Figure 8-6 are interpreted alongside interviews, the picture of each school is slightly more complex than just described. Although without the proportion thresholds used in the figures, Prosperous appears to have more segregated clusters of social types (Figure 8-5) than Rising (Figure 8-6), as discussed in Chapter 7, the Leadership class at Prosperous actually included representatives from the Latino Club and the Multicultural Club, and was perceived by some to be an equal division of labor across different student types (see Lexy's quote in Chapter 7, p. 94). Further, despite social types that would not mix with each other, and the high consensus amongst survey respondents on the top two Central Social Types (see Figure 7-1), some students perceived the social types to each have its own influence in school:

I've been to eight schools, not high schools, but because I moved around a lot and based on what I remember... this school actually is like—it seems like that it's not that there's a central group. It's just that there are different groups that are about the same influence over everybody (*Ade, Prosperous*).

There are various groups and there are degrees of people that are influential... I know, for whatever reason, a bunch of really nerdy kids have gotten stardom (*May*).

Thus, the clusters at Prosperous could be conveying a completely different story from plain segregation.

Similar to Prosperous, at Rising, there was also quite a high consensus on the Central Social Type, though in contrast, social type clusters were not as visible based on common school clubs. This may indicate that there is more mingling between the different social types, which are not defined by a specific set of school clubs. For instance, Jim, Mary, and Nadia all saw social types to not define social interactions or activities:

I do this thing... where you go to other schools for a day. It's easy to see differences in types of people when you're from the outside looking in, as opposed to I'm in the Rising community. And so I think Rising is great because I think that someone like Don who is the purest kid you can meet and then maybe someone who is really deep into the partying, well Don can get along with that person. They can have a good time just hanging out. So I feel like as long as you're willing to put yourself out there, maybe in an uncomfortable situation for ten to 15 minutes, you can get to know someone well enough that it won't matter any more (*Jim*).

Huh. I don't know. I usually talk to everyone, so I don't know if there's someone that wouldn't get along with someone else (*Mary*).

Obviously, like it's weird for a Jock to be best friends with like an Emo kids or something like that. But I don't really think - like, there's no groups that butt heads... It's hard to contradict Jock with anything else because there's so many people that do other things but also play sports... But like, I don't know, you'd think like drama kids or something... But like, one of my best friends is in drama. So it really just depends on the person (*Nadia*).

However, Jim, Mary, and Nadia identified respectively as a Floater, Overachiever, and Popular, all of which, according to Figure 8-6 are well interconnected to each other via school spirit/civic types of activities. Thus, although these interview accounts may explain the less evident clusters by school clubs at Rising when compared to Prosperous, they could also convey a center-periphery distinction: Those at the center are well connected and do not see or feel the exclusions that those at the

periphery can see. For as described in Chapter 7, interviews and observations suggest that social divisions exist, and despite the inclusion of Outcasts in the ASB at Rising, they are not active participants in it. The Populares and Jocks led the ASB at Rising. Further, as mentioned 4-Emo, 20-Tough, and 10-Loner do not have any common activities with other social types at Rising. Two of these (Emo and Tough) were described by interviewees as one of the social types that does not mix well with the school-spirited and Nerds respectively (Tough is the equivalent of Gangsters). So, the center-periphery divide may be more marked than the nodes in the common activities network illustrate.

8.4. Summary

I compared how social types are associated to school clubs in two schools and categorized the school clubs into types of activities (e.g., school spirit/civics, academic & STEM, arts & music, etc.). Based on such categorization, I found that there was a different perception of Partyers in each school, with the Partyers at Rising being less involved in school spirit/civics; perhaps also explaining its less central status in the nomination of Central Social Types in Chapter 7. I clarified that although Jocks did not receive as many nominations as the Popular to be the Central Social Type (in Chapter 7), Jocks' school clubs overlapped to a large extent with the Populares; thus validating that when interviewees' expressed that Jocks run the Leadership class at Rising, they may have been referring to a larger category of Populares. I also visualized how social types relate to each other based on the school clubs they share in common, and found that at Rising, perhaps due to the smaller number of domain-specific school clubs, a higher proportion of students than at Prosperous used generic descriptors (not school clubs) to describe their social type's main activities. However, even after removing such generic descriptors, the network structure of social types channeled by common school clubs at Rising was more dense (more overlaps between social types) than at Prosperous. This suggested that there were less clear-cut school-club identifiers for social types at Rising when compared to Prosperous, where social types clearly clustered around common domain-specific school clubs. When incorporating interview data, the story about social type overlaps at Rising became more complex. Once the

interviews hinted a potential center-periphery divide, such divide was somewhat visible in the social type overlaps.

With the data presented, I cannot yet make definite conclusions on how social types are interconnected. For one, the findings in this subsection come primarily from one type of data representation (how social types are interconnected or channeled by school clubs which are perceived to be the activities in which people in these social types are most active). The advantages of using such data are in conveying what the general perceptions are. The limitations are that we do not actually know whether friendships and social interactions create the same social type clusters.

Thus, in the next chapter, I further examine how social types are interconnected or overlap based on common friendships across social types. Although the friendships and their social types are reported by the survey respondents, and thus a type of “perception,” these are all based on each respondents’ personal interactions with their friends, rather than on a perception of a central social type.

Chapter 9. The Structure of Social Types based on Common Friendships

In this chapter, I address research question 2 (how are social types structured based on common friendships between social types?). As mentioned in the introduction (Chapter 1), this is an important question because the social organization of social types conveys how friendships are channeled across social types. This, in turn, provides insights into the social milieu in school—how easy or difficult it may be for adolescents, particularly those with diverse interests and social identities, to obtain social support from diverse peers and cross social boundaries; and how social information (social values, norms, and access to social support) are channeled through friendships. As mentioned in Chapter 8, the social structure of social types based on common friendships may also help to further make sense of the structure observed in the common activities networks described in Chapter 8—whether the patterns of social type structures observed in the common activities network also exist via common friendships.

I used survey respondents' self-reported friendships and respondents' identification of these friends' social types to answer research question 2. In the student survey, respondents filled the name of friends with whom they hung out⁶¹ the most often. Then, for each friend, respondents selected a social type with which they (and others most likely) identified the friend. The social type was selected from the list of social types that the respondent had previously identified to exist in the school (see Chapter 6, section 6.2).

9.1. Friends' Social Types: Differences between the Schools

The two schools had some similarities and differences in the social types of respondents' friends. This section describes such similarities and differences, though the main focus of the chapter is primarily on the social structure of social types. In

⁶¹ I used "hanging out" rather than "best friend" with because the notion of friendship is confounded by the reference to any social connection one has on Facebook as "friends." Also, during adolescence, the notion of "best friend" is no longer as socially valid as it is for younger children.

both schools, the most frequently identified social type for friends was Average, suggesting that for the majority of students, their friendships were not in clearly distinguished social types. This makes sense as a large proportion of respondents were also 2-Average, and students tended to nominate friends in the same social type (see section 9.2.1). This also hints that the 2-Average may be helping to hold a stable social milieu in school. Nevertheless, given statements and experiences from students on social division, exclusivity, and limited or lack of interest in participation in the Leadership class, I proceed to examine social type structures.

Excluding social types which make up 1% or less of the total number respondents in each school, friends' social type labels that existed at Prosperous but not at Rising (based on student surveys) include Internet (5%), Mexicans (4%), and Drama kids (4%) (see Figure 9-1).⁶² As mentioned in previous chapters, Internet was specific to those involved in internet technologies and the Robotics Club, which did not exist at Rising; and Mexicans and Latinos who identified as such at Prosperous seemed to hangout amongst themselves during lunch time and after school. As for Drama, the club existed in both schools, and based on interviewees' statements about the strong identity of the drama kids at Rising, I do not think that the lack of a Drama social type says that such identity did not exist at Rising. Rather, students realized that other survey questions asked about school clubs and activities, and used Performer to describe the social type (see Appendix 2).

⁶² Percentages are calculated using the total number of respondents as the base. Since each respondent could nominate up to three friends, the percentages look higher.

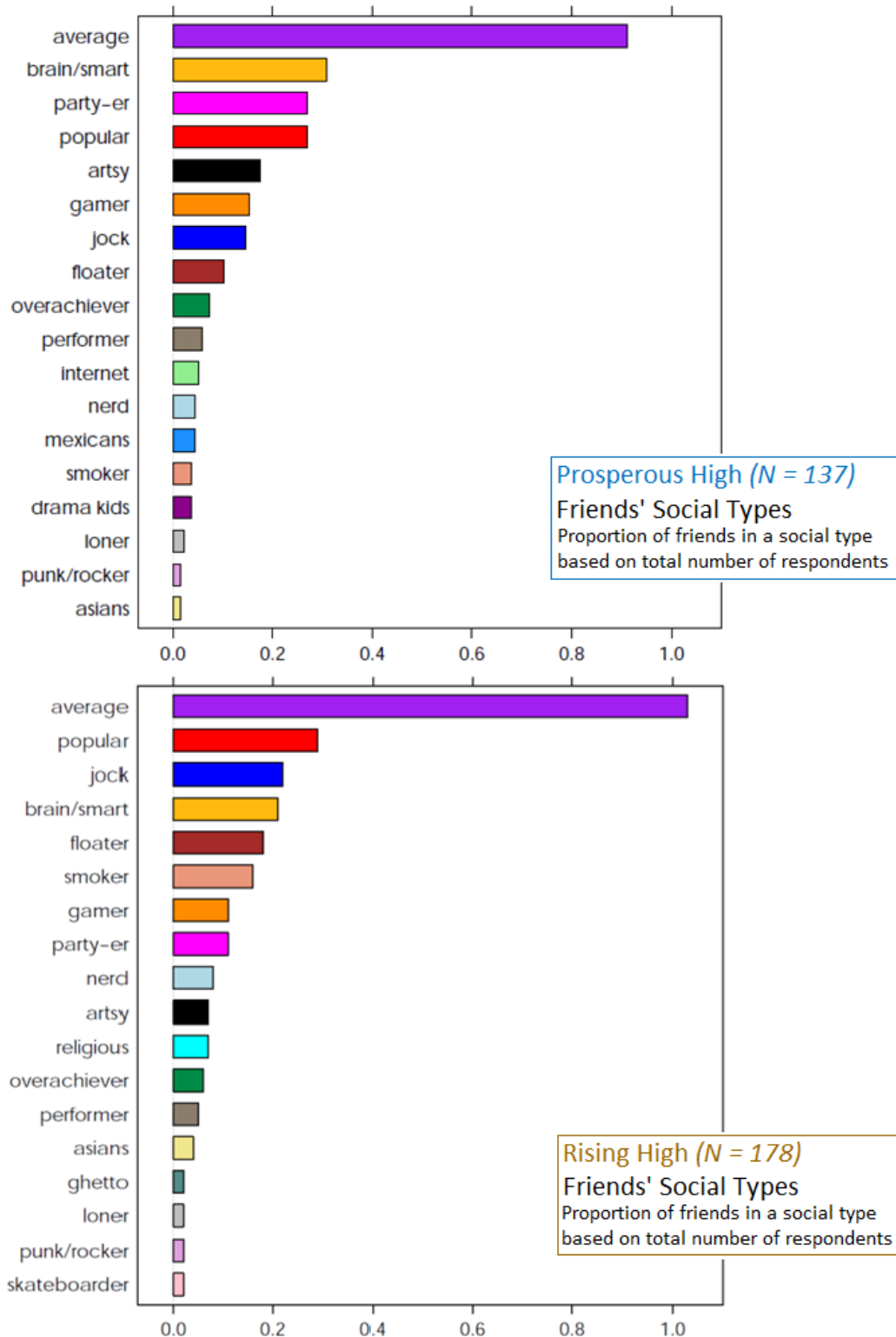


Figure 9-1. Friends' Social Types as a Proportion of the Total Number of Respondents

Each respondent nominated up to three friends. As respondents tended to have friends of the same social type or at most from two social types, a proportion of 0.3 or more indicates that a large segment of respondents labeled friends within that social type. Only friends' social types which make up more than 1% of the total number of respondents are illustrated.

Friends' social types that existed at Rising but not at Prosperous were: Religious (7%), Ghetto (2%), and Skateboarder (2%) (see Figure 9-1). As mentioned in Chapter 6, the social type Religious did exist in both schools, but perhaps respondents at Prosperous did not identify themselves or their friends' primary social type with such label. Perhaps the focus of my research on friendships and interactions at school (rather than out of school) heightens perceptions of non-religious social identities, particularly since neither school had a religious denomination or sponsored religious clubs after school. Also, a very small percentage of respondents at Prosperous (not Rising) identified as Skateboarder, the opposite of what occurred with friends' social types—Skateboarder existed at Rising but not Prosperous. However, as mentioned in Chapter 6, social types are limited to those recognized by peers. So, it could be that friends' Skateboarder characteristics were dominated by social types which overlapped with more peers in school.

Differences between social types can be hard to assess independently, as social identities are created relationally, from peers' projections and adolescents' reflection of their relationship to others. Thus, in the next sections, I examine how social types (of respondents' friends) are structured based on their overlap or common friendships.

9.2. Conceptual Foundations Applied in Data Analysis

Before examining the social structure of social types based on common friendships, I clarify how the conceptual foundations described in Chapters 2 and 3 are applied here.

9.2.1. Respondents' affiliation to their friends' social types

Respondents' identification of their three friends' social types can be treated as an affiliation network (e.g., a network of people connected to groups or categories) because respondents are affiliated to their friends' social types via their friendship to these friends (see Chapter 3). At the same time, who respondents hung out with shaped how peers perceived them (see Chapter 7, quote by Jill, p. 93). Thus, in some way, friends' social types constitute part of respondents' social identities, reinforcing the

notion of respondents' affiliation to these social types. Therefore, the theory and methods behind the analysis of people's affiliation to collectivities described in Chapters 2, 3, and Appendix 3 are applicable.

The notion that one's friends are part of one's social identity is supported by *homophily*—the sociological phenomena that people who associate with each other have similar characteristics at some level (Kandel, 1978). In fact, the median percentage of friends in the respondents' same social type was .52 ($SD=0.31$) at Prosperous and .44 ($SD=0.3$) at Rising. This is a high proportion especially since each respondent only nominated three friends, and the Average social type (the majority of respondents) are characterized by not really identifying strongly with any one social type, and by relating most other social types.

9.2.2. Common friendships: Respondents at the intersection of friends' social types

In Appendix 3 (A-3.3), I explain how the affiliation network of respondent to friends' social types was manipulated to obtain the common friendship networks for each school, presented in Figure 9-2 and Figure 9-3 (placed at the end of section 9.3.2 for easy comparison between schools). In Appendix 5, I describe how UCINET Netdraw creates these network graphs. In Figure 9-2 and Figure 9-3, nodes represent social types. A line between two social types indicates that they share common friends; i.e., they overlap. That is, a set of respondents indicated that they have friends in the same pair of social types. These respondents are friends⁶³ that people in the two social types have in common; they are the overlap or intersection between pairs of social types. Thus, I refer to the graphs in Figure 9-2 and Figure 9-3 as common friendship networks. These networks focus on how different social types overlap based common friendships. It should be noted that although for almost all social types, the greatest proportion of friendships were in the same social type as the respondents', the focus here is on how easy it is for adolescents to navigate and transition across social type microsystems,

⁶³ This assumes that friendships are mutual, though they may not be. However, the concern is not in the mutuality of friendships, but in the overlap or commonality that exists based on the "respondents who have friends in the same pair of social types," and the phrase "common friends between social types" is a shorter way to refer to the aforementioned idea.

and how friendships (and thus social information, cross-boundary access, social support, values, and norms) are channeled across social types.

9.3. Comparing the Common Friendship Networks with the Common Activities Networks

9.3.1. Higher density and shorter distances between social types at Rising

When comparing the common friendship networks in Figure 9-2-a with Figure 9-3-a (both placed at the end of section 9.3.2) with the common activities networks (Figure 8-5-a and Figure 8-6-a), we can see that similar to the common activities network, in the common friendship networks, social types at Rising are slightly more densely interconnected via common friendships than at Prosperous. In other words, social types at Rising tend to have more overlaps amongst each other than social types at Prosperous. The density at Rising's common friendship network (Figure 9-3-a) is 0.095 ($SD = 0.13$), whereas the density at Prosperous' common friendship network (Figure 9-2-a) is 0.085 ($SD = 0.16$), slightly lower, but not significantly different. However, the higher density of interconnections at Rising becomes more meaningful when looking at the geodesic distances between social types. In the common friendship networks, the *geodesic distance* between two social types is the shortest path, or pathway formed by the links, for one social type to reach another social type via their common friendships. Shorter geodesic distances between social types in a common friendship network, compared to longer geodesic distances, indicate that more overlaps based on common friendships exist amongst more social types in that network. At Prosperous (Figure 9-3-a), the longest geodesic distance⁶⁴ was of path length 3⁶⁵ ($Mean = 1.9$, $SD = 0.9$), while at Rising (Figure 9-3-a), the longest geodesic distance is only of path length 2 ($Mean = 1.5$, $SD = 0.5$). In other words, on average, at Rising, any social type could reach a third social type via their common friendships with the same social type; whereas at

⁶⁴ Geodesic distances were calculated with binary adjacency matrices, where an overlap between social types either exists or does not exist because the concern is on whether channeling can occur or not.

⁶⁵ I excluded the social type 81-Drama when counting the longest geodesic distance at Prosperous because it is an *isolate* node, not connected to the rest of the network. That 81-Drama does not have common friendships with other social types is likely an artifact of having only a couple of survey respondents list it as a social type in the open-entry option. However, it also shows that for these respondents, all of their friends were in Drama; thus the social type does not overlap with others.

Prosperous, an additional social type would be needed for some social types to reach each other via common friendships (e.g., for 13-Partyer to reach and any of the following: 103-Internet, 32-Mexican), at least when links of any weight (or proportion of common friendship) count.

Figure 9-2-a and Figure 9-3-a only gives us a general sense of network density and reachability, but the figures do not clearly show social type clusters, which was one of the reasons I engaged in examining social type overlaps based on common friendships. Thus, as with the common activities network, I used DeJordy et al. (2007)'s approach to visualizing proximity data, which involves keeping only links (between nodes in the network) that meet certain criteria or thresholds to help visualize how close or distant the nodes are in a Social Space (in my case, of similarities based on overlap by common friendships). In Figure 9-2 and Figure 9-3, values in the upper left corner of each sub-figure (a through d) are *proportion threshold* values set to help clarify which social types are more similar based on higher proportions of common friendships. Lines between social types are kept only when the proportion of respondents who have friends in two social types is higher than the threshold. In each school, proportion thresholds were chosen based on the observable changes that the proportions enabled.

9.3.2. Prosperous High: Similar social type clusters to the common activities network but with more variation of social type overlaps

As can be seen, at Prosperous, the social type clusters based on common friendships in the common friendship network (Figure 9-2) are more similar to those in the common activities network (Chapter 8, Figure 8-5) than the common friendship network at Rising is similar to its common activities network (compare Figure 9-3 and Figure 8-6). Nevertheless, at Prosperous, the social type clusters in the common friendships network exhibited more variation on the social types which overlap with each other than in the common activities network. This difference may suggest that although social types may share common activities, friendships may be either all within the same social type, or not be determined by school club/activities. For example, at Prosperous, we can see that at proportion threshold ≥ 0.2 (Figure 9-2-d,

delineated within blue dotted lines) social types 3-Brain, 6-Gamer, 31-Asian, 11-Nerd, 10-Loner, and 1-Artsy form a cluster of interconnected social types with overlapping friendships, which are more densely connected amongst them than with the rest of the network. A similar cluster can be observed in the common activities network (Figure 8-5-a & b, delineated in dash blue lines)—the Academic & STEM types of clubs, which in addition to the aforementioned social types, also includes 103-Internet and 12-Overachiever, but does not include 11-Nerd⁶⁶.

This difference, between Prosperous' common activities network and common friendship network, can be explained. 103-Internet, is not connected by common friendships at threshold 0.2 (Figure 9-2-d) due to its strong relation to the Robotics Club. As a result, students in the 103-Internet social type tended to have friendships being within the same social type. However, tracing a few thresholds back, we can see that 103-Internet formed a three-way network with 6-Gamer and 3-Brain (see Figure 9-2-a, and Figure 9-2-b, within lightly dotted blue lines), in a similar way that these social types did when channeled or linked by Academic & STEM types of activities in Figure 8-5. With regards to 12-Overachiever, in both types of networks, it is initially interconnected to diverse social types (with 3-Brain,⁶⁷ 2-Average, 5-Floater, and 19-Smoker in the common friendship network—see Figure 9-2-b; and with 3-Brain, 2-Average, 5-Floater, 8-Jock, 13-Partyer, 15-Popular, and 31-Asian in the common activities network—Figure 8-5-a). This makes sense because 12-Overachievers earn the label by being involved in various activities, and thus are connected to those active in school spirit/civics, sports, and more. However, at higher proportion thresholds, in the common activities network, 12-Overachiever has stronger activity overlaps with social types involved in the Academic-STEM cluster. In contrast, in the common friendship network, 3-Brain is the only academic social type with which 12-Overachievers have common friendships, and 12-Overachiever also has overlaps with socially connected types (5-Floater and 19-Smoker). Here, the common friendship network enables us to

⁶⁶ No 11-Nerd existed in the common activities network because there were no self-identified Nerds, and the common activities network was based on respondents' social types and Central Social Types.

⁶⁷ There is actually no link from 12-Overachiever to 8-Jock in Figure 9-2-a. The line goes past 8-Jock to connect to 3-Brain.

see connections beyond perceptions of social types based on school clubs. Since Overachievers are perceived to be most heavily involved in AP (advanced placement courses), Honor Society, and the general perception is that Floaters or Smokers are not engaged in these school clubs, then Overachievers did not overlap with such social types in the common activities network, but did overlap with Floaters or Smokers in the common friendship network. Thus, the common friendship network enables more variation in social type overlaps by including social types which are not perceived to be involved in school clubs. Specifically, in Figure 9-2 we can see that for the respondents who had friends in both 12-Overachiever and 5-Floater (or both 12-Overachiever and 19-Smoker), a proportion of about 0.2 (Figure 9-2-d) were connected to these pairs of social types.

In relation to the school spirit/civics cluster observed in the common activities network at Prosperous (Figure 8-5-b, cluster to the left of 2-Average), we can also observe that the common friendship network shows variation in social type overlaps beyond definitions by school club or activities. For instance, 8-Jock, 15-Popular and 13-Partyer are tightly interconnected in the common activities network (Figure 8-5-a to d), but in the common friendship network, their mutual overlaps can only be seen at proportion threshold 0.01 (Figure 9-2-a). At higher proportion thresholds, such as Figure 9-2-c and Figure 9-2d, these social types had friendship overlaps of higher proportions with other social types than amongst them (e.g., overlaps existed between 13-Partyer with 19-Smoker, 8-Jock with 19-Smoker and 2-Average, and 15-Popular with 5-Floater and 2-Average, but not between 8-Jock, 15-Average, and 13-Partyer).

Last but not least, in the common friendship network at Prosperous, 32-Mexicans shared, at lower thresholds, common friendships with the Academic & STEM cluster (Figure 9-2-a and Figure 9-2-b) primarily due to the small number of respondents identifying with the 32-Mexican social type who had friends outside their own social type. The one who did was involved in gaming. As the proportion threshold increases, 32-Mexican becomes disjointed from the rest of the network of social types channeled by common friendships, much like the 32-Mexican and 9-Latino social type

were disjoint from the network of social types channeled by common activities. Thus, the differences between how the 32-Mexican social type overlaps with other social types in the common activities network vs. the common friendship networks is a superficial one. The nature of the 32-Mexicans being disjoint from the rest of the network exists and is visible in both network representations.

In sum, at Prosperous, despite evident similarity between the clusters of social types in the common friendship network and those in the common activities network, the common friendship network exhibited slightly more variation (than the common activities network) in the characteristics of social types which overlapped—not limited by perceptions on their activity involvement.

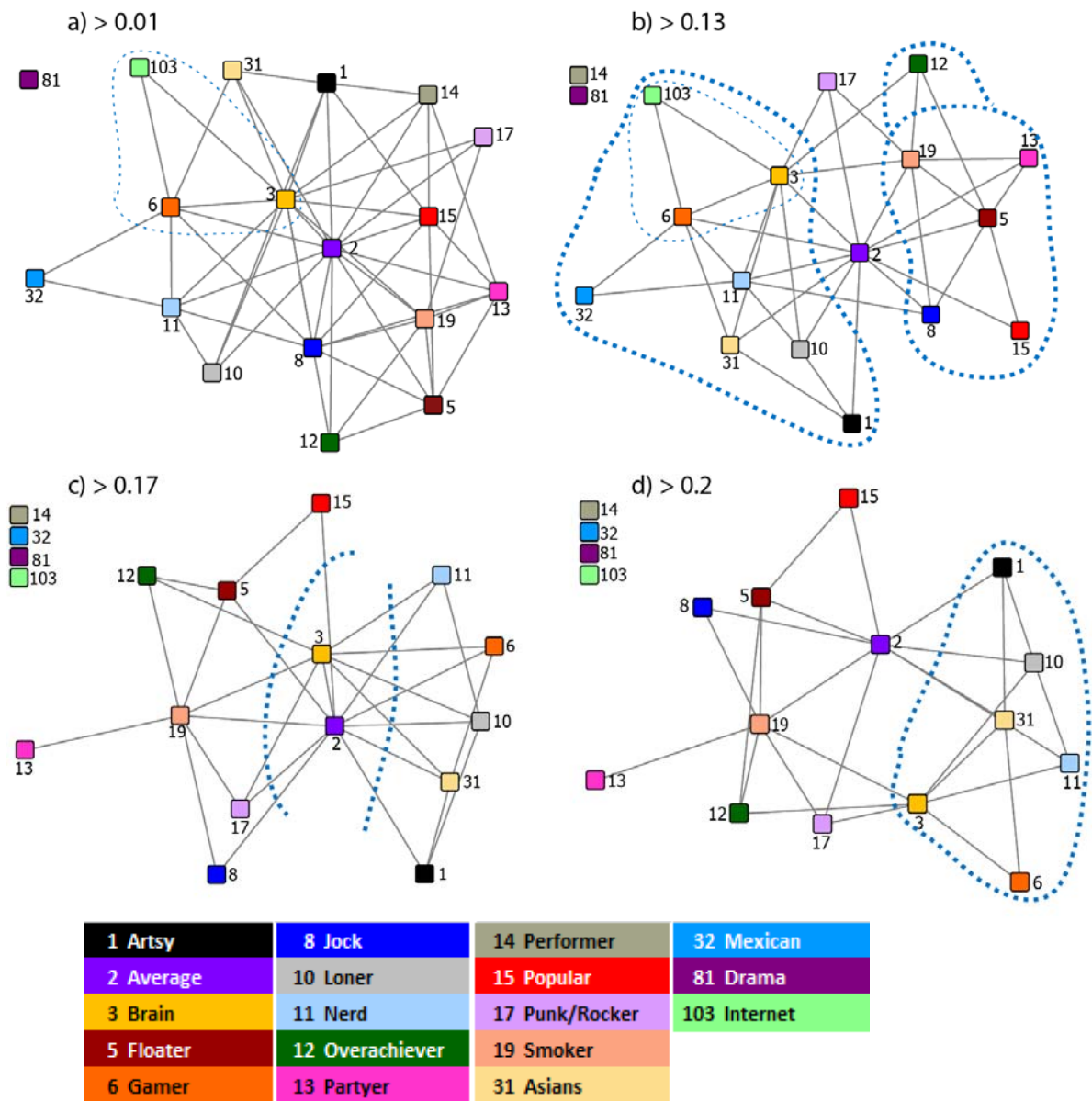


Figure 9-2. Prosperous High: Common Friendship Network: How Social Types are Structured based on Common Friendships.

Nodes represent the social types of respondents' friends. Only social types with more than 1% of the total number of friends are included. A link between two social types indicates that they share common friends. Values in the upper left corner of each figure are proportion thresholds. Links are kept only when the proportion of respondents who have friends in two social types is higher than the threshold. This enables us to see which social types are more similar by their overlapping friendships (DeJordy et al., 2007). Nodes are positioned using UCINET Netdraw's spring embedding layout (see Appendix 5 for an explanation of this technique). Thick dotted blue lines delineate clusters that are more densely interconnected amongst themselves than with the rest of the network. These clusters show more variation in social type (by expected characteristics) than in the common activities network in Chapter 8.

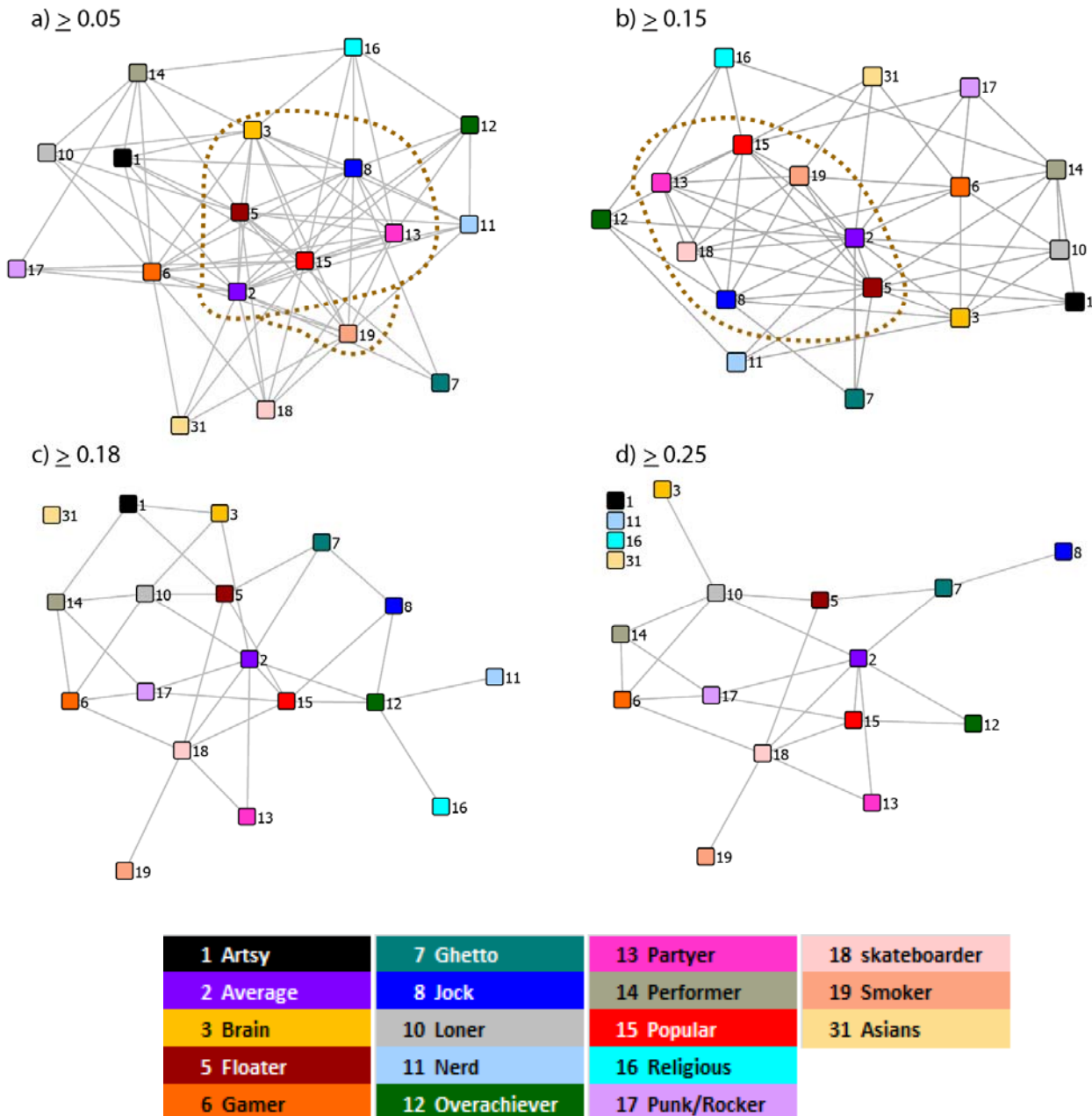


Figure 9-3. Rising High Common Friendship Network: How Social Types are Structured based on Common Friendships.

Nodes represent the social types of respondents' friends. Only social types with more than 1% of the total number of friends are included. A line linking two social types indicates that they share common friends. Values in the upper left corner of each figure are proportion thresholds. Links are kept only when the proportion of respondents who have friends in two social types is higher than the threshold. This enables us to see which social types are more similar by their overlapping friendships (DeJordy et al., 2007). Nodes are positioned using UCINET Netdraw's spring embedding layout (see Appendix 5 for an explanation of this technique). A center-periphery pattern can be observed in (a) and (b), delineated by the brown dotted lines. Nodes are more densely interconnected within such "center" than outside of it, at the periphery.

9.3.3. Center-periphery structure at Rising High: Enabling a more in-depth look at the “center” of school social life

At Rising, the social types did not cluster as clearly as they did at Prosperous. This occurred both in the common activities networks as well as the common friendship networks. For example, in the common activities network at Rising (Figure 8-6-a & b in Chapter 8), a center-periphery structure is more evident (as circled by brown dotted lines), whereas clusters were more evident in the common activities exhibited at Prosperous (Figure 8-5-a & b). In the common friendship networks, at Rising, some clusters exist, but not necessarily by common activities (see Figure 9-3-b to d, 6-Gamer, 14-Performer, 17-Punk/rocker are connected via common friendships, but not by common activities in Figure 8-6). Further, the center-periphery structure in the common friendship network at Rising is also more evident than any possible clusters (see Figure 9-3-b).

When discussing the common activity network for Rising High, I mentioned that rather than crisp clusters by activity categories, Rising potentially had a center-periphery divide, with those centrally engaged (e.g., 15-Popular, 3-Brain, 12-Overachiever, 5-Floater in Figure 8-6-b⁶⁸) not personally experiencing the divisions experienced by those at the periphery (e.g., 4-Emo, 20-Tough, 11-Nerd, 14-Performer, 17-Punk/rocker and others). 2-Average is centrally engaged, but since it has common activities with many social types at the periphery, it gains a different perspective from other social types who are at the center of the center-periphery divide.

The center-periphery divide is somewhat evident in the common friendship network, at least in the first two proportion thresholds (Figure 9-3-a and Figure 9-3-b). The brown dashed lines enclose social types by a faction or partition in the network that is more densely interconnected with social types in the faction than with social types not in the faction (Hanneman & Riddle, 2005, chapter 4, section: Finding and visualizing local substructures). In each network in Figure 9-3-a and Figure 9-3-b, two sets of brown line ovals are drawn: the inner oval delineates the social types at the

⁶⁸ With 8-Jock having less common activity overlaps with all others, due to its primary involvement in football and sports.

“center” that can be spotted visually (e.g., in Figure 9-3-a, 2-Average, 5-Floater, 3-Brain, 13-Partyer, 15-Popular, 8-Jock are centrally positioned in the common friendship network, and obviously more densely interconnected to each other than to other social types); the outer circle includes social types that are in the same faction (i.e., more densely interconnected amongst them than with other nodes outside the faction), as calculated in UCINET Netdraw (Borgatti et al., 2002).

Unexpected social types at the center of the network. Based on factions (the outer brown dotted oval in Figure 9-3-b), 19-Smoker is added to the list of social types aforementioned at the center of the network (and as can be seen, 19-Smoker has the same number of links to other social types at the delineated “center” as does 3-Brain). In Figure 9-3-b, 3-Brain is no longer part of the central set of social types, and 19-Smoker is again included in the same faction as the other centrally located social types. This is an interesting contribution by the common friendship network, not visible in the common activities network. In the common activities network, because the social type 19-Smoker is not perceived to engage in structured school clubs, it does not overlap with many other social types.

The central positioning of 19-Smoker in the common friendship network reflects proportions reported in the survey and interviewee participants’ accounts. In the student survey, 4% of the respondents (N = 178) selected Smoker as the Central Social Type (see Figure 7-1) compared to 2% of respondents at Prosperous (N=137). In addition, at Rising, there were nineteen Smoker friends, which made up 16% of the survey respondents (see Figure 9-1) compared to only five Smoker friends at Prosperous, which made up 3.6% of the respondents. Even so, the central positioning of the 19-Smoker social type was still surprising. However, when examining interviews in more detail, the network and interview data validated each other. The common friendship network enabled me to better interpret stories shared by interviewees. For example, when describing the Central Social Type (at the center of school social life), Bea shared:

It would definitely have to be the more popular kids. They're a lot of, mostly the cheerleaders that are like in the Popular group and that was centered around it a lot... Rising has this weird things where the main group, the main Popular kids they seem to be the center but I know a whole bunch of the Popular kids and just everybody - a lot of people [inaudible] Rising, they're main thing that circles around the school is kids who can get them like cigarettes because there's like this huge saying at our school where people - I've seen people in the hallways giving out cigarettes to people (*Bea*).

In the interview, Carl, a self-identified Emo, also agreed that Jocks and friendly people would be at the center of school social life when school spirit types of activities were the focus. However, in the survey, he selected the Smoker social type as the Central Social Type. He explained:

Probably 'cause I know that there are a lot people here that are into that kind of stuff and when it said central people - I mean, before you kind of elaborated into depth but I felt like just the main majority of people here [smoke] (*Carl*).

Even Nadia, next year's elected student President in the Popular social type distinguished between being "kid popular" and "school popular." She was not explicit with the types of things that you could "get away with," as I suspect she was being "school smart" and watching the amount of detail she shared with me:

Like kid popular, as wrong as it is, like if you go to a lot of parties and stuff, I guess you know people, and you see them, like, you can be a little more crude with your humor too, and it's just like a little more relaxed. And you can do crazy stuff and get away with it kind of thing. Whereas at school, there's like a definite line that you can't cross. Like at school popular, you have to be kind of corny with what you say, and make sure you're not offending anybody for like school events (*Nadia*).

The reader may also have noticed that 18-Skateboarder is also enclosed in the faction at the "center" of Figure 9-3-b. This makes sense as 19-Smoker was also

perceived to be involved in skateboarding (see Figure 8-4), and so the Skateboarder connection may be reflecting such overlap. At higher proportion thresholds, 19-Smoker was no longer as centrally positioned in the network. This makes sense as the sports and school-oriented social types are still aware of the importance of maintaining their drug-free record in school to not affect their performance and future trajectories. Four (out of 14) interviewees at Rising shared losing friends to drugs—their friend had to leave school, and/or they chose to not be in close contact with their Smoker friend to be able to continue being in a sport team or maintaining their academic record.

A deep center-periphery divide. Although the center-periphery divide at Rising was not as evident at higher proportion thresholds (see Figure 9-3c through 9-3-d), this may actually be an indication of a deeper center-periphery divide. The reason that the center-periphery divide was not as evident at higher proportion thresholds is because the links or overlaps between social types are normalized proportions and the social types at the periphery tended to have smaller number of people (see how social types at the periphery in Figure 9-3 tended to have smaller proportions of nominations in Figure 9-1). Thus small size overlaps of common friendships between social types could result in higher proportions at the periphery, and higher numbers of common friendships for the social types at the center could result in lower proportions. From this perspective, at higher proportion thresholds, the less dense interconnections between the centrally located social types can be explained by lower percentage of overlaps with other social types and higher exclusivity within central social types. This is highly plausible since the 15-Popular social type at Rising was by far the most frequently identified Central Social Type (43%), more than 20 percentage points above any other social type. This is validated by interviews. For example, Val described the Popular social type as being “clicky.” When I asked her to describe how, she gave two examples—prom click and cafeteria seating:

Well, yeah, prom is in a few weeks, I guess the popular group of seniors; there's quite a few of them. They've made this big like 40 person group. They've had to cut people out that they don't think were really like [cut for it]... “We're not

really good friends with so-and-so and so they're like no longer in the group"... It's kind of hard (Val).

Like cafeteria for example, everyone kind of sits at the same table every day... It would be kind of awkward if someone sat at their [the Popular's] table (Val).

With such exclusivity of the Populars at Rising in mind, then, the lack of an evident center-periphery visual structure at higher proportion thresholds in the common friendship network (with Central Social Types not being positioned at the "center" such as in Figure 9-3-c and d) is actually because the friendship overlaps across multiple social types are primarily occurring for social types that would be at the periphery (the ones at the center—the Popular—are being exclusive). Further, not all social types at the periphery are interconnected; thus creating a lopsided heavy left periphery (of 1-Artsy, 14-Performer, 6-Loner, 3-Brain, 6-Gamer, 17-Punk/rocker in Figure 9-3-c), and lighter peripheries on the right, top, and bottom (right: 11-Nerd, and 16-Religious; top: 7-Ghetto; bottom: 18-Skateboarder, 19-Smoker, 13-Partyer).

In comparison, the exclusivity of the Popular was not as evident at Prosperous. For example, although 15-Popular was also the most frequently identified Central Social Type at Prosperous, it was followed closely by 13-Partyer. Further, because at Prosperous, social types evidently clustered by common school clubs or activities, it appears that friendships were also more likely to form around common activities than at Rising. Prosperous' common friendship network exhibited clusters similar to those in its common activity network. Exclusivity at Prosperous seemed not to be determined by social type, but by activity type (as I elaborate later).

Clusters of social types at the periphery are not based on common school clubs.

Despite the evident center-periphery structure at Rising, we can see that the common friendships at the "periphery" do correspond to common activities of the same domain, which share the same Social Space. For example, 3-Brain, 1-Artsy, 14-Performer and 17-Punk/rocker are interconnected by common friendships (see Figure 9-3-a through c).

These common friendships, though not dense across social types, remain until

proportion threshold .18 (Figure 9-3-c). We can see that these social types are channeled by common activities (activities they share) in Figure 8-6-a through 8-6-c, (namely via band, drama, and concerts; the latter not a real school club). The main difference with Prosperous then, is the lack of a range of social type clusters based on common domain-specific school clubs/activities that share Social Space. For example, at Prosperous, there were at least two evident clusters: the Academic & STEM cluster, and the school spirit/civics cluster. These two clusters reflected the sets of domain-specific school clubs shared by common interest groups (e.g., Robotics, Physics, Digital multimedia, and Science Olympiad are activities described with similar sets of descriptors; and school spirit types of activities are described with similar set of descriptors). In contrast, the social types at the “center” or at the “periphery” at Rising do not really share sets of domain-specific school clubs of the same type; i.e., they do not share similar sets of descriptors.

Unlike Prosperous, where the common friendship network had more variation of social types linked, at Rising, the common friendship network and common activity network each provide different social type variations. For example, the variations for the cluster at the “center” of the networks was already discussed, and in the aforementioned lopsided left periphery of social types channeled by common friends (1-Artsy, 14-Performer, 6-Loner, 3-Brain, 6-Gamer, 17-Punk/rocker in Figure 9-3-c), 6-Gamer, and 10-Loner were included, whereas when channeled by common activities (see Figure 8-6), 10-Loner is not connected, and 6-Gamer is in a completely different cluster. The Gamer discrepancy observed between the common activities and common friendship networks can be explained by the lack of a real Gaming club at Rising, as verified by interviews and observations. In other words, those who identify with the social type Gamer do not have a shared activity time or space to form friendships based on their interest in gaming, and as a result, their friendships are not formed based on common gaming activities. A similar explanation can be made for Loners, who are not involved in any activity. The lack of correspondence between the 6-Gamer social type identity, structured school clubs, and friendships at Rising, when compared to Prosperous, will be a topic of further discussion in the rest of the dissertation.

9.3.4. Summary

In summary, based on qualitative comparison of the common friendship networks and the common activities networks for each school, the structures of these networks were different between both schools, but similar for each school, with minor variations. The structure of social types at Prosperous showed evident clusters based on common activities. In contrast, the structure of social types at Rising, although showing some evidence of overlap based on common activities, was more that of a center vs. periphery division. Possibly the smaller set of distinctive domain-based constructive activities contributed to such difference.

9.4. Centrality and Social Divisions Observed in the Network Graphs

The common friendship networks discussed above and the common activities network discussed in Chapter 8 also enabled us to see that the Central Social Types identified by survey respondents (illustrated in Figure 7-1) are not necessarily centrally positioned in these networks to interconnect or channel friendships and social information between other social types. Assessing which social types play interconnecting roles is important because my interest is in identifying opportunities for participation in Leadership and civics. Since there is some similarity between social type clusters based on common activity participation and those based on common friendships, knowing which social types play key interconnecting roles can enable us to see how to target resources and efforts to involve students from diverse social types in leadership and civic types of activities (e.g., inviting different school clubs or types of students to organize activities typically organized by the Leadership class). In order to understand the differences between students' identified Central Social Types and the social types which measured highly in centrality, I define some terms first.

9.4.1. Degree and betweenness centrality: On having common friendships with many other social types and interconnecting the overlaps between social types

Centrality in social networks can be defined in many ways, but in the broadest sense, it refers to the importance of each node, be it person, group, or category, in a network. According to Borgatti et al. (2002), *centrality* is a structural characteristic of

nodes in networks, and not an inherent attribute of the actors or nodes independent of the network. Centrality is a measure of a node's potential for being important, influential, or a key bridge based solely on the node's network position (Borgatti et al). There are multiple types of centralities. Given my interest in how social types channel friendships, social support, and social information, I focus primarily on two types of centrality: degree centrality and betweenness centrality, and place particular attention on the latter.

Degree centrality refers to the number of ties or links that a node has to others. In the common friendship network, degree centrality can be an indication of how popularly connected a social type is. For example, in the common friendship network in Figure 9-3-d, the degree centrality of 2-Average is 7, and of 13-Partyer is 2. This means that at that proportion threshold, 2-Average has common friendships with seven other social types, and 13-Partyer has common friendships with two other social types. To compare networks of different sizes, the degree centrality values can be normalized to produce a value between 0 and 1. To normalize, the raw value is divided by the maximum degree possible in the network (usually $N-1$, with N being the total number of nodes in the network). Thus the normalized degree centrality for 2-Average in the same network is $7/(18-1) = 0.41$, and for 13-Partyer is $2/(18-1) = 0.12$.

In this context, degree centrality is the proportion of other social types with which one social type has common friendships. In the common friendship network, degree centrality can be affected by the number of people in the social type, but not in absolute terms. For example, in both schools, 2-Average has the most number of respondents' friends; at the same time it does not have distinctive characteristics, and thus overlaps with the most other social types and has the highest degree centrality (see Figure 9-4). At Prosperous, 3-Brain is the second most commonly identified social type in respondents' friends, and also has the second highest degree centrality. However, 8-Jock is the third most frequently identified social type in respondents' friends, but does not have the third highest degree centrality in both schools (see Figure 9-4).

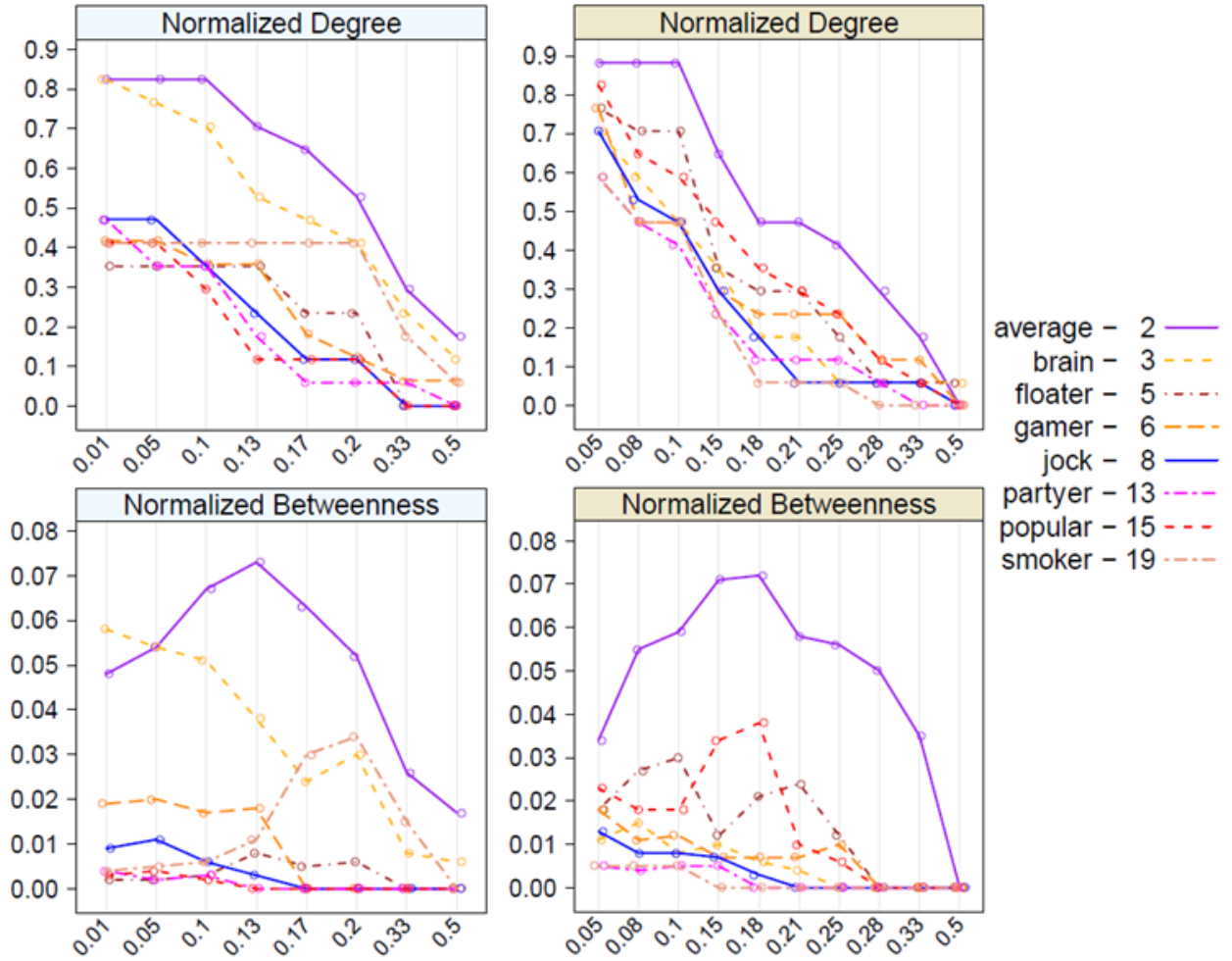


Figure 9-4. Normalized Degree and Betweenness Centrality for the Common Friendship Networks at Prosperous (left, blue) and Rising (right, brown).

The X axis represents the different proportion thresholds, and the Y axis the centrality values at each proportion threshold. Only the centrality of Central Social Types identified in Chapter 7 are illustrated. Degree centrality consistently decreases across proportion thresholds, whereas betweenness centrality depends on the network structure

Betweenness centrality refers loosely to the number of geodesic paths (shortest paths) that pass through a node (from all other nodes) (Borgatti et al, 2002). In other words, it is “the share of times that a node i needs a node k (whose centrality is being measured) in order to reach node j via the shortest path” (Borgatti, 2005, p. 60).⁶⁹ In the

⁶⁹ For all pairs of actors i and j in which actor k is involved in the pair’s geodesic(s), betweenness centrality C_b is calculated by the formula below, and as an undirected graph of common friendships between social types, C_b is normalized by dividing by $(n-1)*(n-2)$:

$$C_B(n_k) = \sum_{j < i} \frac{g_{ji}(n_k)}{g_{ji}}$$

common friendships networks, the betweenness centrality of a social type category indicates how important that social type is as a liaison interconnecting social types which do not directly overlap or have common friendships—the share of times that a social type interconnects other social types using the shortest path.

Betweenness centrality can also be thought of in terms of how much network flow a node ‘controls’ since the node could potentially shut down the network flow (Borgatti, p.60). In this sense, betweenness centrality is also an appropriate measure for the common friendship networks. As I showed, in these networks, social types cluster to some extent by common activities and common friendships. Thus, social information, norms, values, social support, and friendships could be channeled through activity contexts and/or friendships. In this sense, the “network flow” described by Borgatti refers then to the potential that social information, values, norms, activity interests, social support and friendships are channeled across social types through their overlaps; and the potential that such channeling is disrupted by social types which do not liaise friendships they have from different social types. Betweenness centrality can be normalized by dividing the raw value by the maximum possible betweenness (see footnote 69 below).

9.4.2. Central Social Types vs. social types which play channeling roles

As Figure 9-4 above shows, the social types most frequently identified as Central Social Types that were common to both schools (i.e. 15-Popular, 13-Partyer, 3-Average, 8-Jock, 3-Brain, and 5-Floater, 19-Smoker, illustrated in Figure 7-1) measured moderately (0.4 to 0.6) to high (0.7 to 0.9) in degree centrality, but generally low in betweenness centrality (less than 0.3). At Prosperous, except for 3-Brain and 2-Average, none of the other Central Social Types had degree centralities higher than .5 or betweenness centralities higher than 0.02 (with 2-Average and 3-Brain having betweenness centrality of 0.048 or more). This makes sense when we look at Figure 9-2, in particular sub-figures c and d. The Academic & STEM and school spirit/civic clusters of social types are positioned to the right and left (delineated with dotted blue lines) of 3-Brain and 2-Average, the two social types with the highest betweenness centrality.

Social types from the Academic & STEM cluster on the right of Figure 9-2-d need to go through their common friendships with either 3-Brain or 2-Average to reach social types in the school spirit/civic cluster (Tad's social type, 103-Internet, does not directly overlap with any of the school spirit/civic types of social types). Note that social types in the school spirit/civic were expected to be "central" based on students' perceptions and selection of the Central Social Type, but were not central, or do not have the potential to channel friendships and social information across diverse social types, in the common friendships network.

At Rising, as expected given the higher network density in the common friendship network, the degree centralities for the Central Social Types are overall higher than those at Prosperous, with the lowest degree centrality being 0.6 for 13-Partyer and 19-Smoker at the first proportion threshold. The center-periphery division is also verified in centrality measurements, as the social types which were not identified as Central Social Types by survey respondents) had degree centralities consistently lower than 0.6 (thus the more dispersed links at the periphery of the common friendship network). However, unlike at Prosperous, 3-Brain did not play a key interconnecting role, which can also be seen in the common friendships network in Figure 9-3. Beyond proportion threshold 0.15, 3-Brain becomes part of the periphery. The most frequently identified Central Social Type at Rising, 15-Popular does play a higher interconnecting role than the 15-Popular at Prosperous, as evidenced by the peak of red line in the normalized betweenness graph for Rising in Figure 9-4. However, it is primarily the 2-Average social type which interconnects other social types that do not have common friendships. Further, at higher proportion thresholds (e.g., 0.18 and 0.25 in Figure 9-3-c and Figure 9-3-d), we can see that the geodesic distance (i.e., shortest path) between social types increases, with some social types requiring going through the common friendships across three other social types before they interconnect (e.g., 14-Performer and 8-Jock; 14-Performer needs to go through 3 hops: first, its overlap with 17-Punk/rocker, then, Punk/rocker's overlap with 15-Popular, and finally 15-Popular's overlap to 8-Jock). This explains the consistently high betweenness

centrality that 2-Average has, as it plays a key interconnecting role in the paths aforementioned.

How does knowing which social types have high betweenness centrality matter?
I discuss this in the next section.

9.4.3. Social divisions exist in the common friendship networks, but liaising opportunities exist

The social divisions between social type clusters, discussed in chapter 7, are also evidenced in the common friendship networks. However, the perspective brought forth by measures of betweenness centrality is that such divisions do not have to remain static because certain social types could play liaising roles if appropriate resources and interventions are implemented. For example, at Prosperous, we can see that the 103-Internet is 3 “hops” (path length) away from the 13-Partyers. By proportion threshold 0.17, all the social types characterized by their involvement in Academic & STEM activities (11-Nerd, 10-Loner, 31-Asian, 6-Gamer plus 1-Artsy) are also 3 hops away from the 13-Partyer and have to go through their overlap with either 3-Brain or 2-Average (the social types with the highest betweenness centralities) to reach social types in the school spirit/civic cluster. If Partyers are the “really social” people that Tad described, then the common friendship network (Figure 9-2) and interview accounts (Table 7-1) paint a coherent picture of the most evident social divisions.

If social cohesion and a change in perceptions of social types involved in Leadership/civics is desired, then, given the interconnecting role that the 3-Brain plays and its overlap with the 103-Internet and 6-Gamer social types, activities could be organized such that the 3-Brain help interconnect people from the 13-Partyer and STEM cluster. For example, team contests could be organized for the most creative “school spirit/brainy” activity that requires skills and interests from diverse social types.

At Rising, interview accounts in Chapter 7 revealed that there were different types of social divisions, and such divisions could also be observed in the common friendships network. For example, at threshold > 0.18 (Figure 9-3-c), we can already see that some social types just do not directly overlap. 6-Gamer, 14-Performer, 10-Loner, 3-

Brain and 1-Artsy need to go through their overlap with 5-Floater, or 2-Average to reach 15-Popular, 8-Jock, 7-Ghetto, or 12-Overachiever (and the social types to its right—11-Nerds, and 16-Religious, which need to go through their common friendship with 12-Overachiever to reach other social types). Here, the distance between 11-Nerd and 16-Religious from other social types should not be interpreted as definitive distances, but rather that these social types are more at the periphery, just as the 6-Gamer, 1-Artsy, or 10-Loner are at the periphery in relation to the 2-Average or 15-Popular. Further, based on unrecorded interviews during the pilot survey study, 7-Ghetto can be interpreted as the Gangsters or wannabe Gangsters described in Table 7-1. So, the social division between the drama kids (Performers) and Jocks described in Text Box 7-1, or between 11-Nerd and 7-Ghetto/Gangsters seems to hold for a proportion of respondents.

Since 2-Average is rather a non-descriptive social type, and Rising potentially has a center-periphery divide, a more appropriate strategy at Rising (than depending on the 2-Average to interconnect social types) would be to include more social types from the periphery of the common friendship network when planning school activities. Such strategy may require more one-on-one efforts from teachers and staff to engage students from diverse social types.

9.4.4. Summary

In sum, the common friendship networks enabled us to also observe the social divisions described by various interviewees. However, by looking at the structural position of social types in the common friendships network, I provide a baseline to foresee the network structure beyond social divisions and as opportunities to plan for social types to interconnect or channel friendships from other social types. Whether and how the differences in social divisions and social structure across both schools affect opportunities for involvement in Leadership and school spirit/civics deserves further discussion.

9.5. How Social Type Structures Relate to Opportunities for Leadership and Civics

In this section, I address research question 4 (the additional insights that observations and interviews provide about the socio-technical ecology in school). In both schools, the structures observed in common friendship network and the common activities network rendered themselves visible in students' perceptions of how they fit and their desirability to take part in the Leadership class and school spirit/civics. It is as if these structures translated themselves into self-imposed norms (research question 4a), as I elaborate next.

9.5.1. Center-periphery structure: A lack of interest from those at the periphery

At Rising, the center periphery divide was felt in the disinterest towards Leadership and school spirits/civics activities from students of social types at the periphery of the common friendship network. For example, Damon, who self-identified to be in the Nerdy/geeky social type and is highly involved in the Drama Club, expressed a complete lack of interest in Leadership activities. When I asked him whether he was interested in taking part in the Leadership class, he shared:

Personally? Not particularly, just because - I mean, the Leadership class in the end ends up being the ASB officers and a bunch of mostly like Jocks and people that don't wanna take hard classes and I don't know - not necessarily - I don't necessarily wanna be in a class with all those people too much, personally
(Damon).

His impression of the Leadership class is partly created by the image of those who participate in it:

Yeah, there's sophomore, junior, senior cabinets which are just - I'm pretty sure anybody that shows up, just like big meetings that, in reality, people only go to get out of class (Damon).

Similarly, Mo, who self-identified as Asian (also a social type at the periphery of the common friendship network), described the distance that other social types keep with the Popular social type:

In the movies or something, it's always like the Popular kids and they're mean to everyone and everyone doesn't like them. It's not like that, we kind of distance (*Mo*).

This distance is further enhanced by a lack of interest from social types at the “periphery”:

Well, there is like the Popular group or whatever and it's just like kind of the rich kids who think they're better than everyone else. It's a pretty small group, but they always win the awards and stuff. It doesn't affect anyone else at the school... Like homecoming queen, king stuff like that. It's always just the same people. That's mostly because no one else cares anymore (*Mo*).

No data exists to validate my next comment, but potentially, a change in the type of students involved (to include more Brains, Drama types, or Asians) and the activities organized (to include more global activism and the need for more diverse skill sets) may change Damon's perspective about the Leadership class, and potentially interest him, so that he gains the experience of leading activities that receive school-wide attention.

9.5.2. Social types clustered by common activities: An interest to influence limited by the exclusivity of the Leadership class

At Prosperous' although there was no center-periphery divide, students' opportunity for participation in the Leadership class was limited. Technically, the Leadership class was open to anyone who wanted to take part, but in practice, it was an exclusivity club. When I asked Carey whether she had considered being in the Leadership class, she explained that she had no time, but also added:

And also, they're a very exclusive group. So for this coming year, we [the school] are only going to admit like five people [into the Leadership class].

We're going to loop the entire [Leadership] class, so it just sort of turns you off as someone being like, oh, well, I bet I wouldn't fit in then (*Carey*).

Carey felt like her opportunities to be in the Leadership class and even be involved in other school activities were restricted by the exclusivity held by the Leadership class. Even her participation as a talent show candidate depended on having connections to people in the Leadership class. To be a candidate in the school female talent show, students had to be elected. Carey describes such process:

Before, they used to do a system where anyone could nominate you. But they [the Leadership kids] kind of just picked themselves... [I asked if that created dissatisfaction]. Yeah. Because there were some people who said, hey, I want to do it, but you know we have to have this inside connection. Because my friend was in Leadership and she nominated me personally. So you have to be in the know. You have to have a connection. That sort of sucks... Yeah. I know a lot of people did actually want to do it. But they just didn't know anyone in Leadership. And that sucks (*Carey*).

Despite such exclusivity problem, the structure of social type clusters by common activities was reflected in how different social types perceived their influence and wanted to have influence in school's life. Carey, a self-identified Asian who shared her opinion above, would not complain if she did not want to have influence. Others also described social types in terms of equal influence or overlaps, rather than as concentric circles (which would be an image associated to Rising's center-periphery divide). For example, Ade and Rose both described social types in terms of overlapping circles:

I've been to eight schools, not high schools, but because I moved around a lot and based on what I remember and stuff, then this [a concentric circle] would be a really accurate thing for most schools, but this school actually is like - it seems like that it's not that there's a central group. It's just that there are different groups that are about the same influence over everybody... I'm not -

instead of circles, I say there's just blobs... There could be an overlapping blob and that no blob is really better than another blob, more central, they're just kind of different people that all have about the same influence over everyone (*Ade*).

I think it [the visual representation of social types] would be more of a Venn diagram, like overlap a little bit (*Rose*).

Further, students from different social types influenced and wanted to influence school life:

... but of my kinda just group of really tech savvy kind of people, we have our own influence over the school because we go to - if you've seen the new reader board out there, we all - none of the teachers have any idea how to do anything with it. We had to figure that out ourselves (*Ade*).

9.6. Summary and Implications

In summary, social types were more densely interconnected in the common friendship network at Rising than at Prosperous. Some perspectives on social capital suggest that such dense structures are related to an increase in social capital because the links between nodes are redundant (Burt, 2001). Although network density could be interpreted in terms more redundant overlaps between social types which enable more reliable channeling of [social] information and more cohesion, that was not the case in the two schools I observed. More nuanced assessments of network structure provided better understandings of how the social milieu and structure of social types may have affected students' opportunities for participation in Leadership and civics types of activities.

At Rising, a center-periphery structure existed on how social types overlapped based on common friendships. Such structure was associated with a lack of interest in Leadership and school spirit types of activities from students in social types located at the periphery. At Prosperous, the social type overlaps based on common friendships coincided with sets of common activities, and clusters also remained loosely

interconnected with each other. Such cluster-structure was associated with an interest to influence school life by social types from different clusters, despite the exclusivity of the Leadership class.

Students' perceptions of their roles and interest in the Leadership class reflected the social type structures observed in each school. Thus, although having clusters of social types may seem undesirable due to cognitive associations to segregation, these clusters based on common domain-specific activities may actually enable the development of "counter-identities" (Sonn & Fisher, 1998). Literature on community resilience (Sonn & Fisher) suggests that non-main-stream sub-communities develop counter-identities to protect their core values and practices without disrupting the development of community members' social identities. The common activities shared by community members can mediate the impact of forces imposed by other structures (Sonn & Fisher). In the case of schools, the dominant forces may include the decades of tradition glorifying sports (like football, basketball) and associated school spirit events (like homecoming king and queen). Thus, creating domain-specific school clubs and activities that attract only a subset of students with specific interests is not a bad thing. What seems important is to plan for enough sets of domain-specific school clubs so that each cluster has enough numbers and diversity of students, and that the common Social Spaces are shared between social types in each cluster. The diversity and sharing of Social Space may enable: (a) the creation linkages between clusters that prevent the complete separation of one cluster from other activity clusters, and (b) the creation synergistic forces, such as sense of relatedness and camaraderie, that nurture the desire to influence school life by students in these clusters.

Chapter 10. Mediated Channeling of Friends across Social Types via Technologies: Socio-technical Affordances and Technologically Reinforced Identities

Adolescents are amongst the most avid users of diverse communication technologies and social media (Lenhart, Madden, & Hitlin, 2005; Lenhart, Madden, Smith & MacGill, 2009). These technologies are part of how they relate to their friends, peers, and adults in school. People's social identities are socially developed through inter-group/category relationships (Tafjel, 2010). Thus, these technologies are an integral part of adolescents' social identities. An attempt to understand the social ecologies of social types in high schools is incomplete without also examining the role of *mediated sociality*, or the social organization (i.e., association to categories and the inter-categorical relationships) created via technology mediated communication. I engage in such endeavor in this chapter. My focus is in examining how the social structures observed in common friendship networks are replicated when the link between social types represents technology interactions that the social types have in common (research question 3). This is an important question. Given the role of mediated communication in adolescents' development of friendships and social identities, and the close relation that friendships and identities have with adolescents' activity participation patterns, addressing this question can contribute new understandings about: (a) how social types are related to each other; (b) how technology use practices are part of adolescents' social identities, friendships, and activities; (c) the socio-technical affordances within which technology use practices and social identities are contextualized; and (d) assessments of the desirability of technological features given the competing needs between delineating the boundaries of an identity category and bridging diverse social types to create optimal social structures for adolescents' social development in schools.

In this chapter, I first describe general descriptive data about survey respondents' mediated communication: the frequency with which survey respondents' used each of the 7 technologies listed in the student survey to interact with the three friends that respondents' reported in the survey. I then address research question 3: To

what extent does *mediated channeling* (i.e., technology-mediated friendship channeling) of friends across social types replicate the social structure of social types—the unmediated channeling (examined in Chapter 9)?

10.1. The Data used in Common Technology Interaction Networks

As described in Chapter 9, survey respondents reported up to three friends with whom they hung out the most often and identified each friend's social type. Respondents also reported the frequency with which they interacted with each friend via 7 technologies: email (*em*), instant message (*ins*), texting (*txt*), cell phone (*cell*), social network sites (*sns*), Twitter (*tw*), and virtual worlds (*vw*). Respondents could choose one of 10 frequency intervals,⁷⁰ from “never” to “6 or more times a day,” to account for a wide variance of usage patterns across different technologies (for example Twitter was not popularly used and required to be measured in terms of times per month or year, whereas texting was used very frequently, and required a unit of times per day). The text in parentheses after each technology above will be used throughout figures in the rest of the dissertation as short labels to refer to these technologies.

Survey respondents reported their use of these 7 technologies independently of any particular system or client. For instance, instant message (*ins*), or technologies that enable synchronous chatting between distributed parties, included clients which typically could be used independently of other non-instant message applications. Instant message clients included Windows Live Messenger or MSN, AOL instant message or AIM, Yahoo messenger, Skype, Google talk, pidgin, IRC, or any other applications that enable simultaneous access to diverse instant message clients via one single interface (e.g., Trillian, meebo, etc.). Respondents did know that Facebook chat was an instant messaging client, but they typically viewed it as a component within Facebook. Cell phone (*cell*) usage referred to phone calls and did not include texting. Social network sites included Facebook, MySpace, My Yearbook, TAGGED, tangle.com,

⁷⁰ The frequency intervals were: never, less than once/year, 1-2 times/year, 3-5 times/year, 6-11 times/year, 1-3 times/month, 1-2 times/week, 3-6 times/week, 1-2 times/day, 3-5 times/day, and 6 or more times/day.

DeviantART, Ozzfest, orkut, multiply, formspring.me, and any other social network sites that respondents used to interact online with existing and new social relationships. However, based on interviews, Facebook was the most popularly used social network site, and the one that respondents used as the primary reference for their frequency of social network site use. I treated Twitter (*tw*) separately from other social network sites because it was just starting to gain media attention as the third-highest ranking social networking site in January 2009 (Kazeniak, 2009), just 8 months before the time I collected data. Twitter also deserved its own technology category because it was used differently from other social network sites. For example, Twitter typically exhibits record-breaking usage during emergency disaster situations (Mills, Chen, Lee, & Rao, 2009), and prominent events like the death of Michael Jackson in 2009 (Shiels, 2009). At the time of data collection, the general population was just starting to become aware of how Twitter was being used as a live newsfeed and backchannel communication to mainstream media. At the time, it was yet unclear whether adolescents were using Twitter; and if so, whether they were using Twitter with friends.

As for virtual worlds (*vw*), they included online and console games that respondents engaged in such as WoW, Xbox Live games, Sony Playstation games, and any other digital virtual environments which respondents perceived as a virtual world. Although I used the term virtual worlds, respondents included mostly gaming applications under such category. Thus, a more appropriate term may have been virtual games, but I will continue to use the term “virtual worlds” as in the survey.

With the trends of applications to combine functionalities that typically existed in a different application (e.g., chat in Facebook) I did expect that not all technologies could be discretely categorized in these 7 technology types. Even if that were the case, since data is self-reported, it shows respondents’ perceptions of what type of technology they used, which is itself can be rich information.

10.2. Technologies Mediated Communication with Friends

In this section, I describe, the contexts within which technology mediated

communication occurred between respondents and friends. My purpose is to provide the reader with the sense that the teens in my study were much like other teens. I recommend those interested in more detailed narratives and theories on teens' social media and technology use to refer to (boyd, 2004; 2007; Ito et al., 2010; Hogan, 2010). Prior literature on teens' technology use typically report usage as if all teens were in one same category. In this section, I add insights about technology mediated communication differences by social types. I offer hints of potential differences between social types in how technologies are used to interact and communicate with friends, and set the stage for section 10.4 (How the Mediated Channeling of Friendships across Social Types Replicated the Social Structures Observed via Unmediated Channeling).

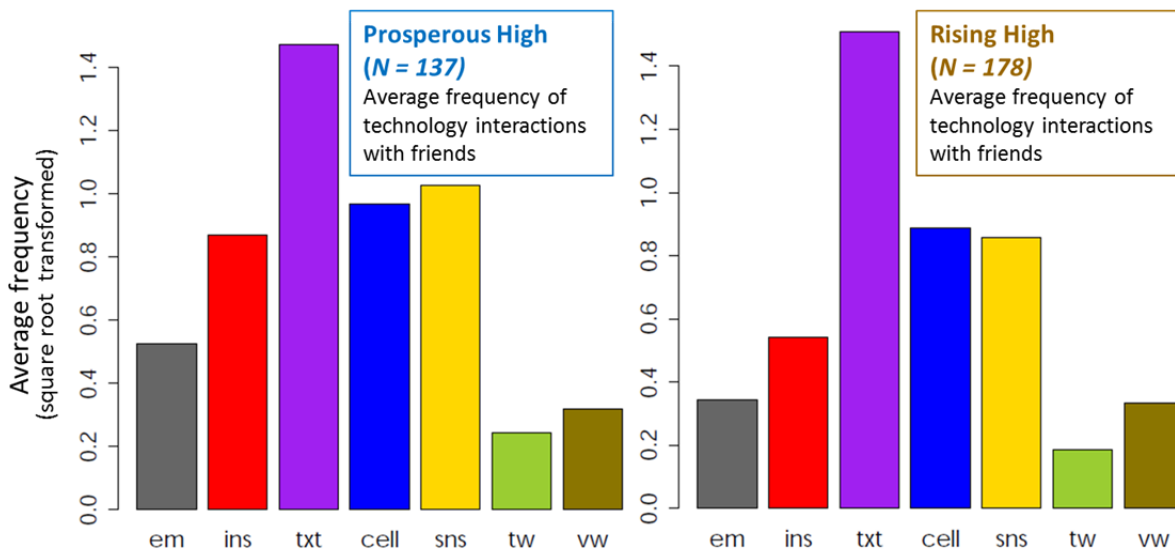


Figure 10-1. Average frequency of technology mediated communication with friends

Values are square root transformed to reduce the distance between similar high values (e.g., 1 per day and 2 per day are cognitively not that different). 0 = never; 0.2 = 1 time/month; 0.4 = 1 time/week; 0.6 = 3 times/week; 0.8 = 5 times/week; 1 = 1 time/day; 1.4 = 2 times/day. Frequencies are averaged across all respondents' mean interaction with their friends. At Prosperous, 7 respondents (5%) nominated and reported mediated communication with 2 friends only; and 3 respondents (2%) with 1 friend only. At Rising, 6 respondents (3%) nominated and reported mediated communication with 2 friends only; and 3 (2%) respondents with 1 friend only.

Figure 10-1 illustrates the average frequency with which respondents used the different technologies to interact with their friends (the ones they nominated in the survey). The frequency values were normalized, so that a frequency of 1 is the equivalent of once per day, and square rooted so that a value of 1 would not be too distant from 2 (since for many technologies, the distinction between once or twice a day was not as meaningful as the distinction between either once or twice a day and more than twice a day). The average frequency of interaction was calculated by summing across respondents' average interaction with his/her friends, then dividing by the total number of respondents.

Table 10-1. Percent of respondents who used each technology at least 1/year with their 3 friends

	Prosperous High (N = 137) Percent* of respondents	Rising High (N = 178) Percent* of respondents
em	38%	33%
ins	53%	40%
txt	82%	85%
cell	82%	80%
sns	68%	64%
tw	2%	3%
vw	13%	11%

* Percentages are rounded.

10.2.1. Twitter and virtual worlds: least used with friends, but hint at social type differences

As can be seen in Figure 10-1, on average, at the time of collecting survey data (October 2009 - January 2010), Twitter, virtual worlds, and email were the least used mediums of interaction by survey respondents with their three close friends. Table 10-1 shows the percentage of respondents per school who reported using each technology at any frequency rate with any of their three friends. Only 3% of respondents at Rising (about 5) and 2% of respondents at Prosperous (about 3) interacted with any of their 3 friends via Twitter. This makes sense when compared to other studies. In 2009, only 11% of Twitter users were aged 12 to 17 (Miller, 2009). In my data, the few respondents who used Twitter mentioned using it to obtain and share specific interests (e.g., web development, graphic design), and they did not necessarily use it with the friends they

nominated in the survey. For example, Tad, a self-identified 103-Internet person, described using Twitter:

Most of the people I've met on Twitter are not from the area... I've been on Twitter for probably about three years. I was one of the first ones on Twitter.... Being a sort of web developer, it was a good way to connect with the community of web developers (*Tad*).

This matches the bar chart of average frequency of technology per social type in Appendix 2. In this bar chart, we can see that none of the 103-Internet respondents used Twitter with their three friends; and that 6-Gamers and 1-Artsy are the only two social types who use Twitter with the three friends they listed in the survey.

For virtual worlds, interviews reveal that due to time constraints and parental restriction, respondents were not engaging in live multiplayer games in virtual worlds as much. So, virtual worlds were not perceived to be a key medium of communication with friends, except for those who had to be on a virtual game to reach their Gamer friend. For example, Tad shares:

Chad doesn't even have an email address that he checks on a recurring basis. So, [communication with him] it's mainly... Steam messenger, actually... which is a gaming client that you can buy games on... And the reason for that is because while you are playing a game, you can just press the tab key and type at the same time you're playing a game... I don't play so much... but... Chad is basically always playing video games, and so it's just more convenient... to not have to switch out of the game or wait ten minutes for the person to finish a game to go back to the question (*Tad*).

Indeed, we can see from Appendix 4, Figure A-4-1, that at Prosperous High, despite low average frequencies of use on virtual worlds across respondents' social types, a few used virtual worlds with their three friends at least once or twice per week (103-Internet and 1-Artsy), and 6-Gamers used virtual worlds with friends at least 3-5 times/week, the social type with the highest average frequency of virtual world

mediated communication with friends. This data potentially indicates that technology mediated communication with friends differ across social types. At Rising (Figure A-4-3 in Appendix 4), different social types used virtual worlds with their three friends, and 6-Gamer respondents did not report using it with their friends, though 6-Gamer friends were amongst the social types which received the most vw interactions, along with 15-Populars at about 1-2/week. At Rising, the lack of a different 6-Gamer presence in Twitter or virtual interactions when compared to Prosperous may also suggest a different type of Gamer at Rising, as hinted in Chapter 9.

So, despite the low average frequency of use of Twitter and virtual worlds with close friends, these technologies enrich understandings of the role that diverse technologies have in students' social identities, activity practices, and mediated communication. At the very least, in this section they have already hinted the potential differences in mediated communication by social type.

10.2.2. Email is for long messages, homework, or to keep old people separate

From interview accounts, there did not appear to be evident differences between the two schools in how email was used. Email was the third least used technology (based on average frequency of use in Figure 10-1). The low average frequency of use of email was also expected. Researchers have found that adolescents do not use email with friends, and see email as a medium of communication with "adults" including teachers, institutions, and schools, or when writing long messages (Lenhart, Hitlin, & Madden, 2005). Students at both high schools also expressed these preferences for email. Some used email with friends if they needed to send attachments for homework, or if the length of the message was too long. For example, Rose shared:

Email, I use when it would take too long to text it because I can only type 148 characters in my text messages (*Rose*).

However, for the most part, students saw email as a medium to interact with adults. For example, a few interviewees shared:

I could email her [referring to one of her close friends], but whenever I email her, it's mostly to send assignments or something over. So, not much email
(May).

I use email for college coaches, for golf, and my mom, and my boss. That's it
(Chris).

I think it's easier to contact the adults and stuff with email just because it's directly to them... and it's kind of like a personal thing rather than on Facebook, they could go and look at my other things, and what I've been doing
(Amy).

Amy's quote above, also suggests that some technologies are chosen to keep social worlds separate, which I also observed via other technologies.

10.2.3. Texting, cell, and SNS: Most frequently used due to timeliness, intrusion level, and accessibility

In both schools, the most popularly used technologies to interact with their three friends were texting, cell phone, and social network sites. Interview participants shared that texting was reserved for usage with close friends:

She was one of those people I wouldn't think to text... I guess, if it's somebody I don't really talk to ever, I'll just send them a Facebook message because that's just... less stalkerish. It's like I got your cell phone number and now I'm texting you vs. we've been friends on Facebook (Rose).

This quote offers insight into why texting had the highest average frequency of use, since the survey was on its usage with the three friends with whom respondents spent the most time. This is also consistent with my previous observation that technologies are used to separate social worlds. In fact, most participants did not use texting with teachers.

I feel text messaging is for friends, not teachers (Bell).

Nevertheless, some participants, particularly those in sports, did use texting with their

coaches, as a way to coordinate their team practice, since before sports practice, their mobile phone was likely the most accessible technology.

Besides these reasons, amongst close friends, participants, whose texting plan coverage enabled their texting habits, chose using texting with friends over other technologies given its ease of access, proper level of intrusion, practicality, and timely response without being on the face. For example, interview participants shared:

It's like, instead of leaving voicemail, which takes forever to get to, you just send them a text and they get it, and then they text you back. It's on your own time. It's not, like, holding the phone up and having to talk (*Chris, on ease of access and level of intrusion*).

Like I won't call someone when I'm interacting with other people, I won't just pick up my phone and call her, but I will text her (*Kun, on not being intrusive to those around him*).

In the halls, it's too hard to hear people [on the phone] (*Chris, on the practicalities behind texting*).

[With texting] I expect responses almost right away because I respond right away (*Rose, on the timeliness of texting*).

I think it was easier to handle over text... Like I would have an idea or like a view on a subject and he's have his view on the other and then we'd try to argue back and forth and prove each other wrong... I know the way Noel is and typically in an argument I think better and I argue better when I've got time to think about what I want to say [via texting]. Whereas in face to face, it's like your being put on the spot and you're forced to think like really fast... (*Carl, on being able to handle arguments better via texting than face to face because texting gives him time to think*).

Calling someone via cell phone was less frequently used than texting, primarily due to its intrusiveness. However, interview participants would call for urgent needs, or

to supplement a text message if they did not receive a response via text within a reasonable period of time. There also seemed to be a gender specific image on calling friends up. For example, Chris shares:

I don't like to call Jack because it's a little weird. Keep calling the guy every second (*Chris*).

Cell phone was used less frequently with close friends, though like texting, it was perceived to be a more private medium than social network sites. Nevertheless, some students also used social network sites publically on conversations intended for each other, due to convenience, and almost as a substitute for texting when a personal computer was available:

My friends and I will actually talk over Facebook. Like we'll create conversations and things... We actually have full conversations on Facebook... Usually if we're on the computer, we'll just Facebook because it's right there, and you can stay on one machine. But otherwise, texting is just when I'm not at the computer (*Carey*).

Perhaps, carrying full conversations publically on Facebook is Carey and her friends' unconscious way to further create online markers of themselves, beyond the friendship links described in boyd and Ellison (2007).

Further, the use of social network sites with each other seemed to be somewhat contingent on the time frame that adolescents used the social network site, suggesting that school clubs and activity contexts may have played critical roles in the social structures of the common technology interaction networks. For example, Sal and Amy share:

Might be there [on Facebook] at 3:00 until I have to go to dinner and maybe go back on it afterwards... Like, people that do sports, of course they would go on much later than I would... I do notice. Even after, like the next day, I will check up and there'll be a bunch of wall posts that the people that go on really late at night (*Sal*).

I mean, most of my statuses are posted pretty late at night because I do it after volleyball, which is usually pretty late, and not – nobody's really on (*Amy*).

As these quotes show, interaction with close friends via social network sites like Facebook depended on having similar schedules, classes, or activities to shape conversations. As I explain in section 10.6.1, such time divisions created via different activity contexts are important factors in how and why some technologies but not others replicate the social structures observed in the common friendship networks.

Interestingly, Facebook communication with close friends was carried out publically as a way to invite other friends to participate and change the context of the conversation. For example, Carey describes how carrying out full length conversations with her friends on Facebook wall publically opens the opportunity for good spirited intrusion by others not originally part of the conversation:

Well, my friends are a bunch of jokesters, so when you see them like commenting saying like something to another if you intrude on their conversation it's all in good fun. So we do a lot of that (*Carey*).

In this sense, in addition to further marking her identity via communication with close friends (as explained in boyd), public interactions on Facebook for Carey was a way to expand sociality and let others not engaged in the originally conversation break the flow of the expected.

Validating other research, teens in my study also used status updates to portray a desirable self-image:

Oh, definitely, it's huge status thing. I know a kid bragging the other day, oh, I have to choose between Stanford, Yale, MIT, Cal Tech, what do you guys think, you know... (*Carey*).

These types of status updates have been described by others (e.g., boyd, 2007; DiMicco & Millen, 2007; Lewis, Kaufman & Christakis, 2008) in terms of Goffman (1959)'s dramaturgical metaphor in the “presentation of self,” in which people “perform” an

image of themselves front-stage, but keep other acts inappropriate for front-stage in the backstage. Yet, Hogan (2010) argues that such statuses should perhaps more appropriately be conceived as “exhibitions” because the individual has no immediate way of altering the performance, nor does the recorded information carry the “aura” that a living performer has (Hogan, p. 380). As my aim is descriptive, I do not intend to engage in such philosophical discussions, and make connections to other research mainly to contextualize my study participants in relation to such work.

Although many other alternative social network sites were mentioned, for most teens, Facebook was the most commonly used social network site. In fact, except for one or two interviewees who did not use Facebook due to special conditions (e.g., Asperger’s) or used it very little because they did not want relatives and family to monitor their behavior, most interviewees were in one way or another using Facebook, even if just as a “background” to other activities:

Well, whenever I get home I usually check it and then when I’m doing homework I just have it open in the background (*Damon*).

The public nature of social network sites and the need for more personal and dedicated ways of communication with close friends may explain why, despite the popularity of social network sites amongst teens, their average frequency of use with close friends still lagged behind texting.

10.2.4. Instant message interactions with friends: Obvious differences by social type

In both schools, instant message was the fourth most frequently used technology to interact with the three friends (or the third least frequently used), with the average frequency of use being somewhat higher at Prosperous (approximately 5 to 6 times per week) than at Rising (approximately twice per week). Researchers have tended to describe adolescents’ use of technologies as if it applied to all adolescents (e.g., Lenhart et al, 2005), as if adolescents’ technology usage patterns could be described by a normal distribution. However, as with Twitter and virtual worlds, I found that with instant messaging, usage patterns seemed to also vary depending on

adolescents' social type, activity patterns, and friendships. For example, at Prosperous, the 103-Internet, 14-Performer, 6-Gamer, and 12-Overachiever were the social types which used instant message the most frequently with their friends. On average these social types (of respondents) used instant message once or more per day (see Figure A-4-1 in Appendix 4), compared to other social categories which used it 3-6 times a week or less. Most of the social types which used instant messaging the most frequently use it with friends in the Academic & STEM cluster (described in Chapters 8 & 9). At Rising, 6-Gamer was the only social type which used instant message more than once per day (on average). Other social types at Rising used instant message on average 1-2 times per week or less. What may contribute to the use of instant message to interact with friends by some social types at Prosperous but not at Rising?

I provide plausible explanations in the next section. However, I would like to point out that usage with friends also depended on their friends' technology preferences, parental restrictions and service plans, which has been the focus of other research. In addition, interview participants did talk about the use of Facebook groups to coordinate events, group activities, and keep adult scrutiny out. Participants also talked about the creation of special pages for fundraising or community service. Further, interview participants did have "channel blending"⁷¹ (Isaacs, Szymanski, Yamauchi, Glasnapp, & Iwamoto, 2012) experiences, or the simultaneous use of different communication media by the same person(s) in a single conversation (e.g., posting information they obtained in reddit on Facebook, texting someone to get ready to instant message, following up a text message with a phone call, or using Facebook message and texting side by side to argue about an incident). As these were not the focus of my research questions, I will draw on them if they can help interpret findings in the next section.

⁷¹ Recall that I reserve the term "channeling" for the interconnection of friendships and information across social types, and "mediation" to refer to computer mediated communication, "channel blending" is a term coined by Isaacs et al (2012). Thus, I preserve their terminology.

10.3. Concepts and Assumptions behind the Common Technology Interaction Networks

As average frequencies of interaction by social type suggest that the technologies used with friends may be related to students' social types, activities, and friendship patterns, I move forward to the focus of this chapter on research question 3: the extent to which the mediated channeling of friends across social types (i.e., the common technology interaction networks) replicate the social structure observed via unmediated channeling (i.e., the common friendship networks). My purpose is to assess whether technology mediated interactions are supporting sociality in similar ways to unmediated interactions, and what adds to my understanding thus far of the synergistic influences between students' social type identities, their friendships, norms and opportunities for activity participation.

To answer research question 3 (stated above), I correlated the common technology interaction networks with the common friendship networks. I provide an explanation of how I do this in Appendix 6. Here, I first conceptually describe what a common technology interaction network is, and the assumptions behind it.

In Chapter 9, I compared the social structure of social types between both schools. Specifically, the "common friendship network" in each school portrayed how friendships were channeled across social types via those which overlapped or had common friendships (and thus a link in the network graph). In other words, common friendship networks were about how friendships were channeled across social types without technology mediation—*unmediated channeling*. In this section, I examine common technology interaction networks. Similar to the common friendship networks, the common technology interaction networks channel friendships across social types, but such channeling occurs via technology mediated interactions—*mediated channeling*. These networks are about mediated sociality (people's association to categories and the inter-categorical relationships that are mediated by technology), and I call them *common technology interaction networks* because the link, commonality, or overlap between two social types in such networks is the sets of respondents who interacted with friends in both social types (the same set that reported having friends

in both social types) at or above a level of frequency. These set of respondents are the common friendships between the two social types, and their technology interactions with friends from both social types have a common baseline frequency of interaction. Such common baseline of frequency of interaction between social types is the basis for the structure of a common technology interaction network.

In short, in a common technology interaction network, the overlap between friends' social types is the minimum common technology interaction that the two social types have with the friends they have in common. This is why research question 3 is phrased in terms of mediated channeling: **To what extent does the mediated channeling of friends across social types replicate the social structure observed via unmediated channeling?** This question is examined across 7 technologies: email (*em*), instant message (*ins*), texting (*txt*), cell phone (*cell*), Twitter (*tw*), and virtual worlds (*vw*). Thus, each common friendship network has 7 common technology interaction networks, one per type of technology, which I will hereafter refer to as common *em* network, or common *txt* network, and so forth, where "technology interaction" is replaced by the type of technology when using the term "common technology interaction network."

The assumption underlying the common technology interaction networks is that when an adolescent has two friends in two different social types, the adolescent is more likely to channel or interconnect these friends via a particular technology if the interaction with both friends occurs at least above a frequency level of interaction. On the contrary, if interactions via this technology only occur with one friend but not the other (or at very high rates with one friend and very low rates with the other), then the friends from the two social types would not be interconnected via the adolescent, at least not via the particular technology if we expect them to be interconnected above a particular rate, for example to share daily experiences soon after they occur.

As explained in Chapter 9 (section 9.2.1.), respondents are affiliated to their friends' social types, and for each school a common friendship network can be obtained using such affiliation network (see Appendix 3). In much the same way, a

common friendship interaction network can be obtained. The only difference is that the affiliation network of the latter is a *mediated affiliation network*—the values in each cell are the number of friends in a social type with whom a respondent interacted at or above a level of frequency, rather than the number of friends in that social type in the un-mediated affiliation network. Using such mediated affiliation network, I obtained the common technology interaction networks (see Appendix 3). In the common technology interaction networks, the value between two different nodes represent the common number of friends across two social types, with whom a set of respondents interacted at or above a frequency level.

10.4. How the Mediated Channeling of Friendships across Social Types Replicated the Social Structures Observed via Unmediated Channeling

To examine how each of the 7 common technology interaction networks (mediated channeling) replicate the social structure observed in the common friendship networks (unmediated channeling), I correlated the common technology interaction networks to the common friendship networks. The networks were correlated using QAP correlation, a nonparametric technique⁷² for statistical significance testing⁷³ using social network data (Whitbred, 2011). For more details on the QAP and how I used it on this data set, see Appendix 6. The higher the value of the correlation, the more closely the common technology interaction network replicates the structure of the common friendship network. In other words, the higher the correlation, the more consistently a technology is used (on the aggregate) above a level of frequency of interaction (or interaction threshold) with friends in two social types, such that the link between two social types by their common friendships also exists via their common technology interaction.

⁷² Meaning it does not rely on assumptions of independence in the observations that parametric techniques have.

⁷³ Statistical significance testing is the procedure of assessing whether the probability of obtaining a statistical value is greater than chance.

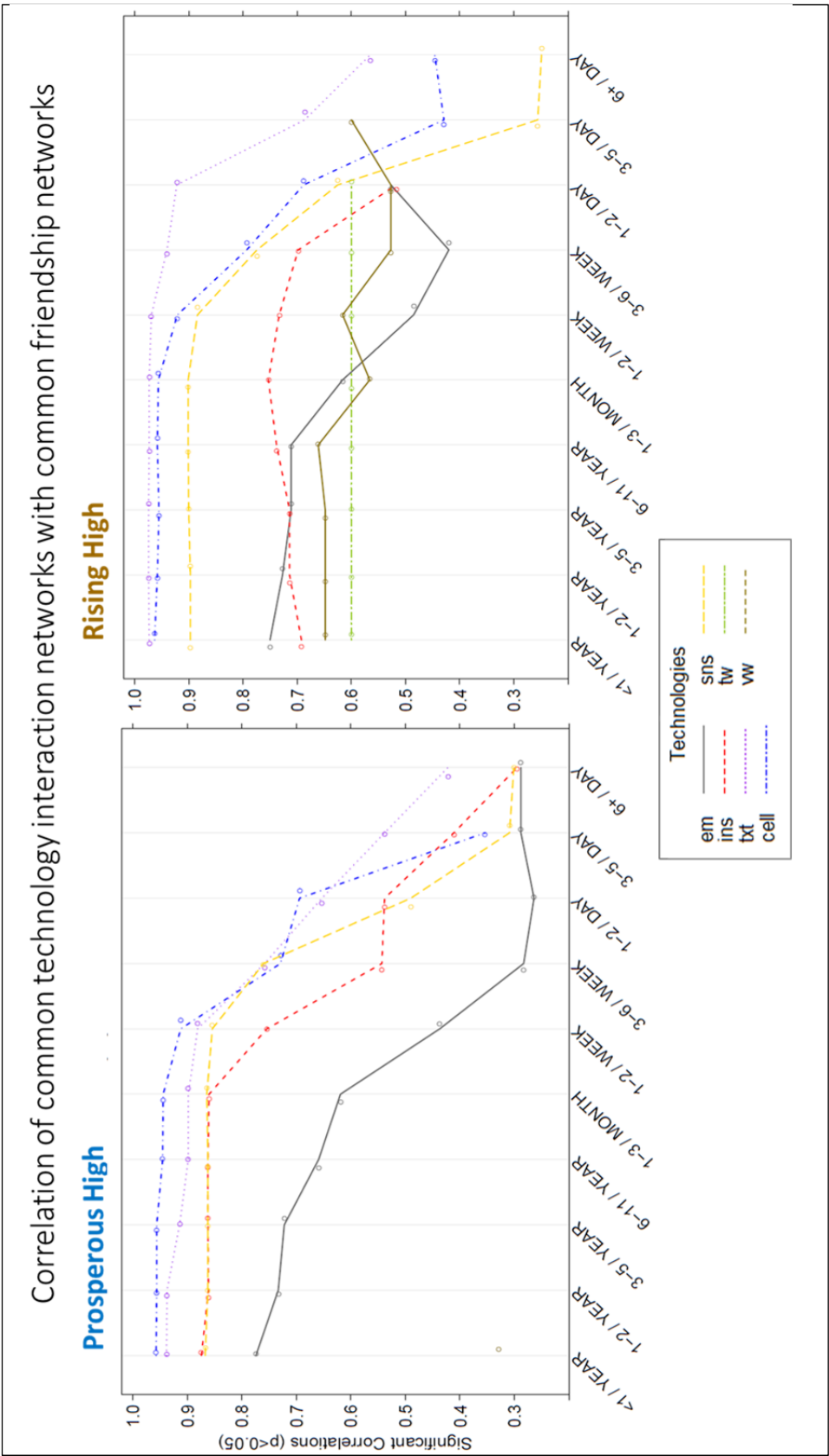


Figure 10-2. Correlation of Common Technology Interaction Networks to Common Friendship Networks across Thresholds.

Only significant correlations ($p < 0.05$) are plotted. Correlations are re-run at different interaction frequency thresholds (or interaction thresholds) such that only common technology interactions (the overlap between two social types) which are greater than or equal to the level of interaction in the x axis are retained. This enables us to see both usage patterns and how the social structure of the common technology interaction networks are similar to the common friendship network.

Figure 10-2 illustrates for each school, how each of the 7 common technology interaction networks correlated to the common friendship network. The X axis shows the technology interaction frequency intervals that survey respondents could select from to report the frequency with which they interacted with each of their three friends. I used the middle value in these intervals as threshold values (call them *interaction thresholds*). The correlations were re-run at each of these interaction thresholds, such that in the mediated affiliation matrices (from which the common technology interaction networks are derived), a respondent was affiliated to his friend only if their technology mediated interaction was at or above the interaction threshold. Thus, in the common technology interaction network, a link (i.e., overlap or commonality) between social types was present only for friends across social types with whom respondents interacted above a frequency level, and also had when the minimum common frequency of interaction.

I use these interaction thresholds because research shows that technology interactions tend to complement rather than substitute other mediated or unmediated social relationships, and that the stronger the social relationship, the more media are used in that relationship (Haythornthwaite & Wellman, 1998). Since survey respondents only reported their technology mediated interactions with the same three friends with whom they reported to hang out the most, it is expected that the common technology interaction networks would replicate the social structure of the common friendship networks, at least to some extent. So, by artificially creating frequency of interaction criteria (i.e., interaction thresholds) for when to count technology interactions as interactions, we can get a better sense of: (1) Which **technology's** common technology interaction network has more stable social structures across different frequency of interaction thresholds. In other words, which technologies are used consistently in common interactions with pairs of social types, even at high interaction frequencies. (2) Which **social types** continue to be linked at high interaction thresholds. This would be an indication that two social types continue to have technology interactions with their common friends at or above the same frequency of interaction. To learn which social types continue to be linked at high interaction thresholds, I examined the network

graph of each technology's common technology interaction network across different interaction thresholds.

Together, points (1) and (2) above can suggest that a technology or an interaction context (for social types) may have socio-technical affordances that enable the common technology interaction network to be highly correlated to the common friendship network. This will become clearer with concrete examples. The important point I am trying to convey here is that the insights offered by points (1) and (2) above are assessments that cannot be made with the averages obtained in Figure 10-1, or the ones per respondent social type in Appendix 4.

Although there are some differences between the various common technology networks, hereafter, I focus on key differences between common technology networks which contribute to our knowledge of the socio-technical context within which social types overlap and the affordances enabling such overlap. Thus, I mainly describe the common *ins* networks and the common *txt* networks in both schools, and use other common technology networks to illustrate key concepts in the method used.

As can be seen in Figure 10-2, in each school, the *cell* and *txt* common technology interaction networks were the most highly correlated to the common friendship network, with significant correlations above 0.9 ($p < 0.05$). What this suggests is that when texting and cell phone provide the mediated channeling between social types, the resulting technology mediated social structures of social types (i.e., the common technology interaction networks) are the most similar to that observed in the unmediated channeling of social types (i.e., the common friendship network). Texting and cell phone were consistently used frequently across social types, and the correlations show that interaction frequencies also occurred consistently above a minimum interaction threshold across social types. More than high frequency of interaction, what contributes to the correlations discussed is having survey respondents who reported friends in two social types, also interacting with these friends via a particular technology, above a frequency of interaction. This is why the artificial constraints imposed by the interaction thresholds can be important, as we

cannot assume that channeling between social types can effectively occur with interaction frequencies of less than once a year.

For example, at Rising, the common *txt* network's correlation remained significant above .9 ($p < 0.05$) up until interaction threshold 1-2 times/day. In other words, when texting provided the mediated channeling between social types, the resulting social structure of social types (i.e., the common *txt* interaction networks) was the most stable relative to other common technology networks. Further, in relation to Prosperous, Rising's common *txt* network was consistently more similar to its common friendship network (see Figure 10-3). In Figure 10-3, at interaction threshold of 1-2 times/day, Rising's common *txt* network is more similar in structure to its common friendship network than the common *txt* network is similar to its common friendship network at Prosperous. The social types that were centrally interconnected remain central, and the center-periphery structure can also be observed (see brown dotted lines, in Figure 10-3, which enclose nodes that are more densely interconnected amongst themselves than with nodes not enclosed by the circle).

Interestingly, at Prosperous, although the common *txt* network did not correlate as highly with its common friendship network as at Rising, it was the social types characterized by school spirit/civics types of activities (circled within blue dotted lines) which remained tightly interconnected to each other via their common *txt* interactions (see Figure 10-3, at 1-2/day). I will elaborate on this observation in section 10.6.1.

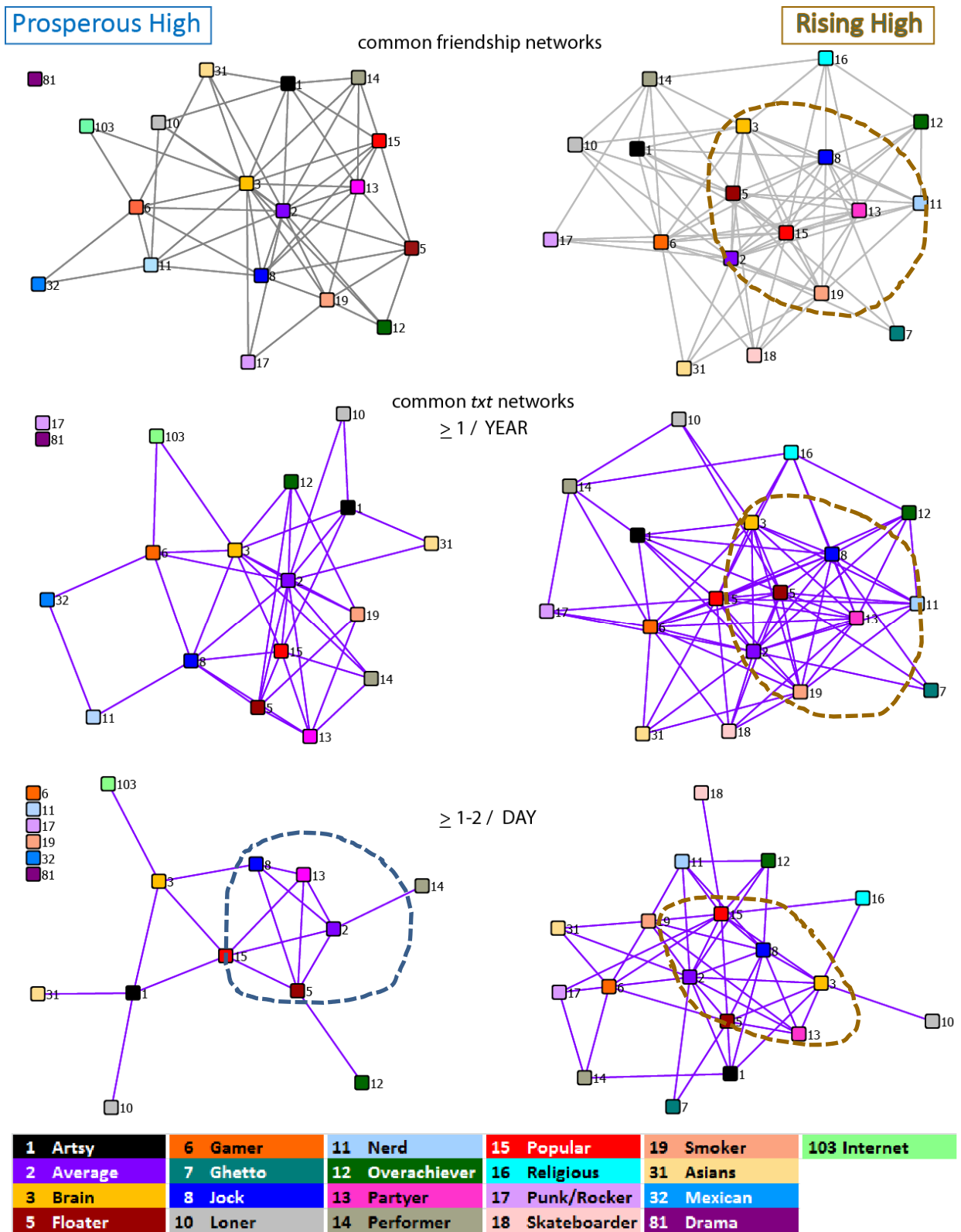


Figure 10-3. Comparison of Common *txt* Networks for Prosperous and Rising High.
 As can be seen, Rising's common *txt* networks are more similar in structure to its common friendship network than Prosperous' common *txt* networks are to its common friendship network.

From the correlations in Figure 10-2, we can see that another key difference is the higher correlation of Prosperous' common *ins* network ($r = .87, p < 0.05$) compared to that at Rising ($r = 0.69, p. < 0.05$). Although at interaction threshold 1-2/week, the correlation starts dropping for Prosperous to a level similar to that at Rising, at threshold 3-6/week, we can still observe in Prosperous' common *ins* network social type clusters similar to those in its common friendship network; particularly, the social types involved in STEM types of activities (103-Internet, 3-Brain, 6-Gamer, 2-Average) are still clustered by their common interaction via instant message (see in Figure 10-4 below, the social types within the blue dotted lines).

At Rising, the center-periphery structure observed in its common friendship network is not replicated in its common *ins* network (see right column in Figure 10-4 below). In the common *ins* network at Rising, although 8-Jock, 15-Popular, and 2-Average are interconnected at interaction threshold 1/year, and these social types made up what would be considered the "center," they depend on the 12-Overachiever social type for their overlap. 12-Overachiever was not at the "center" in Rising's common friendship network. Further, the overlaps between social types which were at the periphery in the common friendship network are lost in the common *ins* network (e.g., 1-Artsy, 14-Performer or 10-Loner in Figure 10-4 under Rising High do not have overlapping common interactions by the lowest threshold of once per year). Thus, the correlations (between common technology interaction networks and common friendship networks) enabled to pinpoint obvious differences between the schools, while the common technology interaction network graphs illustrated how and why the differences existed.

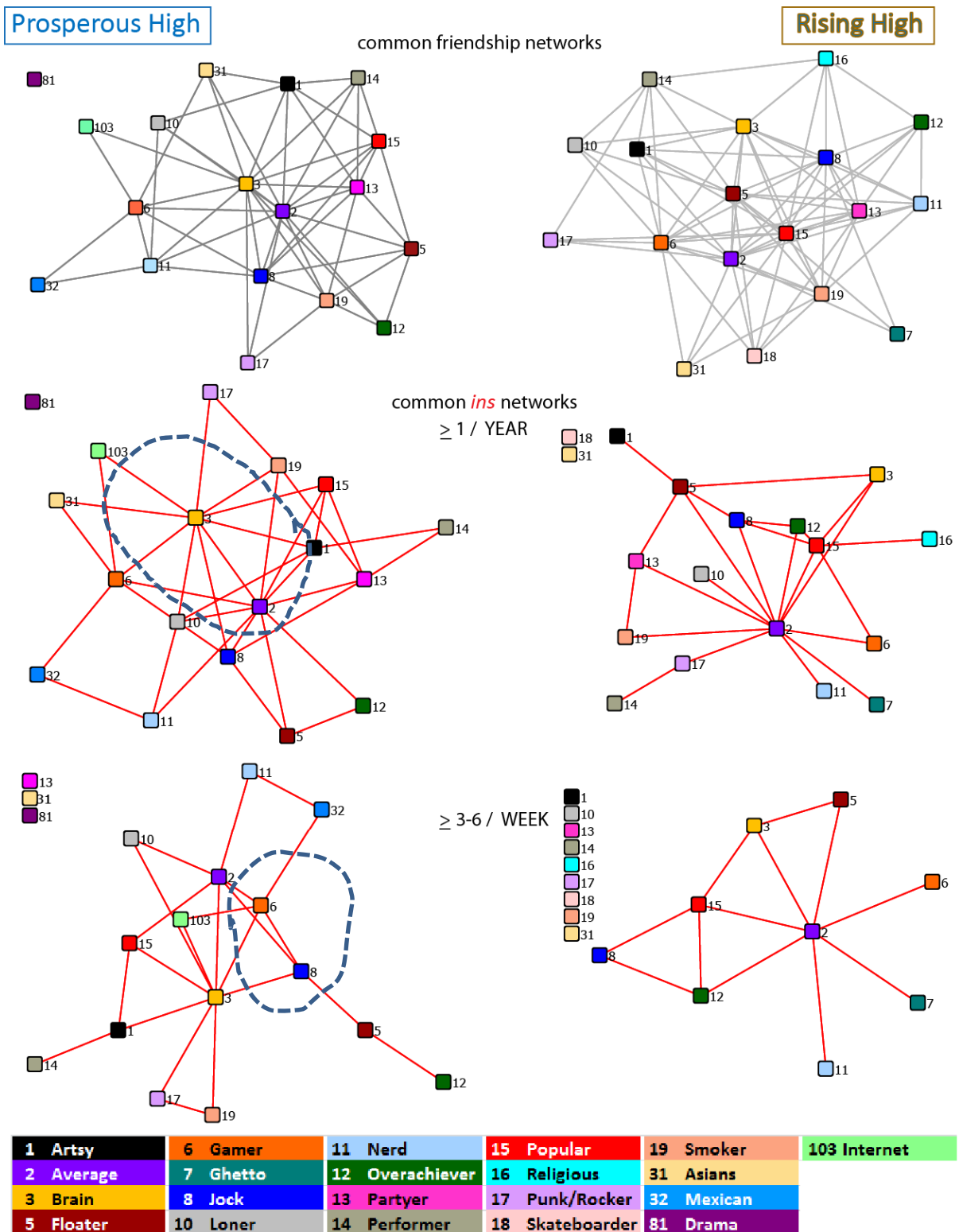


Figure 10-4. Comparison of Common *ins* Networks for Prosperous and Rising High.
 As can be seen, the cluster of STEM social types remain evident in the common *ins* network at Prosperous. At Rising, the center is now only one social type: 2-Average.

10.5. Summary

In summary, in order to better observe different mediated channeling patterns per technology, I artificially increased the interaction threshold above which to retain links between social types in the common technology networks. By doing so, I observed that some common technology interaction networks correlated highly with the common friendship networks (i.e., the social structure of social types was replicated) consistently across interaction thresholds, and with similar correlation values across both schools. Other common technology interaction networks correlated moderately, but with evident differences between both schools. In particular, the common *txt* network and common *ins* networks exhibited the most visible differences across both schools. These are important patterns that I expound on in the next section.

10.6. Interpretation and insights beyond correlations

At Prosperous, the unmediated social types (not mediated by technology, i.e., the common friendship networks) tended to cluster around similar activity types. Thus, if a cluster is retained at a high interaction threshold of a common technology interaction network but not another's, it suggests that something about the synergistic influence between the activity context, the social type identities, and the socio-technical affordances enables such cluster to remain. Here, I loosely adopt Norman (1999)'s conceptualization of *affordance* as action possibilities offered in a socio-technical space where the actions take place, and the people who could engage in these action possibilities can perceive them and enact upon them. I will use the most evident examples to address such synergistic influence.

10.6.1. Common technology interactions afforded by activity contexts

For example the STEM cluster of social types is evident for the common *ins* network, even at interaction threshold of 1-2 times/day (see Figure 10-5 below), but the STEM cluster is less complete and/or dense in the common *txt* network (Figure 10-3), at interaction threshold 1-2 times/day, where the school spirit cluster is more evident (see the social types enclosed in blue dotted lines in Figure 10-3).

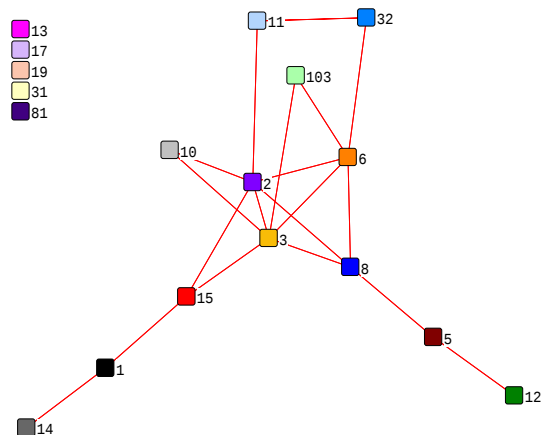


Figure 10-5. Prosperous' common *ins* network at interaction threshold 1-2/day. Notice that the STEM interconnection between 103-Internet, 3-Brain, and 6-Gamer is still evident.

A plausible explanation for the differences described is that the activity contexts for STEM types of activities afford instant message use, whereas the mobility of txt enabled its use during school spirit events and sports. Thus, that STEM types of activities afford instant message interactions with friends at Prosperous may mean the following. The school clubs in which the social types in the STEM cluster participate require that its members engage in the activity for continuous periods of time in the same physical space or that at the very least they share Social Space in some way (e.g., schedule, activity with shared friendships, etc.). Likely activities during such periods are supported by computers that are connected to the internet, through which students can interact with their friends about the projects they are working on. For example, building Robots requires students to use technology parts, look up information online, etc. Similarly, doing math or physics also requires being in one space for a period of time that is sufficiently long to complete problem sets. Even if students did not have access to a computer during the school club's official meeting time, the students have sufficient overlap in interests and shared activities that they are likely to spend time after school addressing or engaging in issues related to STEM, or interact with friends from different social types in such cluster, at least above a minimum frequency of interaction.

In contrast, given the high association between the school spirit/civics types of activities and sports (see Figure 8-2), the social types which clustered around these activities were likely more physically active and mobile during their participation in school clubs after school (e.g., football, basketball, cheerleading, or socializing across different friendship groups). In these situations, the activity contexts do not afford the same technology uses as those used by social types involved in STEM activities, but require that the technology be accessible and portable across various mobility spaces. Texting affords such access and mobility.

At Rising High, I had purported in Chapters 8 and 9 that potentially, a center-periphery divide existed. Specifically, social types at the center, which overlapped in their common engagement in school spirit/civics had many more common activities amongst themselves than did other social types which had less number of overlapping activities (Figure 8-6). Such center-periphery divide and less overlap between those at the periphery may have contributed to the lack of social affordances for instant message interactions to occur across the social types at the periphery. For example, 6-Gamer and 1-Artsy are not at the center of the common friendship network (see Figure 9-3). They have one common activity: gaming (see Figure 8-4), which as I mentioned, was not a formal school club. 6-Gamer and 1-Artsy at Rising have some common friendships (see Figure 9-3-a, where the two are connected). Yet, they do not have an overlap in the common *ins* network, partially due to the low proportion of respondents who have friendships in both social types, but also because they do not share activity contexts that afford respondents who have friendships in both social types to interact with both social types above the same level of frequency. This does not mean that instant message was not used by Gamers. It was—with other Gamers through their informal gatherings, often in the same physical location. However, such instant message interactions by Gamers at Rising likely did not occur with other social types—those who did not strongly identify as Gamers:

Well, the way we use it is that we have computer right here, and then the TV is right next to us, and then we can just play video games and then do message as well (*Phil*).

Again, at Rising, the lack of a common social context in school activities with other social types made it less likely for instant message to be used by the same set of students across both social types at high frequency levels. For example, as mentioned, Phil and his friends' attempt at starting a gaming club did not get fully realized. That obviously did not prevent friendships between those with gaming interests to remain, but their context of interaction at school was not one which reinforced their technology and gaming identities. Phil met with his friends at the library, which involved face-to-face interactions:

Mat introduced me to him [another friend in Phil's instant messaging contact list]. He just kept coming to those library sessions... So, during lunch we'd just go to the library and just hang out there, just talk about certain things and whoever else comes to the library as well [to our area] will come and talk to us (Phil).

The same can be said of other social types that have overlapping friendships (Figure 9-3), but no common school club activities (e.g., 3-Brain and 10-Loner), or of the existence of unstructured activities which do not afford instant message use, even if they share common friendships. For example, 13-Partyer and 19-Smoker share the activities of drinking and smoking. They also have common friendships (Figure 9-3-a and Figure 9-3b), but they do not shape the common *ins* network at high interaction thresholds. They are interconnected by common levels of instant message interaction with their common friends when the interaction threshold is low (i.e., 1-2 times/year), but the proportion of common friends that create the overlap between both social types and the lack of contexts affording high frequency levels of instant message interaction with common friends both contribute to a weak overlap between 13-Partyer and 19-Smoker in the common *ins* network. Their overlap is lost at interaction threshold 3-6 times/week.

In contrast, the common *txt* network at Rising is densely interconnected and replicates the common friendship network closely (see Figure 10-3). Perhaps the less common sets of activity contexts to support sit-down technology use and the

portability of texting, makes it the most widely used technology at high frequency levels; thus enabling common interaction frequencies across social types that have common friendships but don't have common activities.

Having common activities which afford common technology interactions does not explain every overlap or lack thereof between social types in the common *ins* network (or other common technology interaction networks). For example, 1-Artsy and 14-Performer have common *ins* interactions at Prosperous but not at Rising. However, at Prosperous, the two social types were not perceived to have common structured school clubs, and in the common friendship network, their overlap is lost at proportion threshold 0.13. This suggests that the common *ins* interaction between 1-Artsy and 14-Performer at Prosperous is attributable to the few individuals who have common friends in both social types. Thus, the caveat is that given the small number of nominated Performer and Artsy friends in both schools (and any social type with small numbers), the behavior observed from survey data needs to also consider individual variations. Without interview and observation data to explain such differences, I can only highlight the possible influences of size and individual variation. Nevertheless, I believe that interviews, observations and the patterns of other social types do support the proposition of "common technology interactions afforded by activity contexts."

As can be seen in the common *ins* network, common *ins* interactions do exist between other social types at Prosperous, which are not in the STEM cluster. Similarly, at Rising, such common *ins* interactions also exist. However, when comparing the common *ins* network with the common *txt* networks, it is evident that the STEM cluster of social types at Prosperous is more evident in the common *ins* network, and the school spirit/civics interconnections are more evident in the common *txt* networks at both schools. It is these evident differences which the affordance proposition supports.

10.6.2. Socio-technical identities: energy that flourished at Prosperous

In addition to the activity context affordances, socio-technical identities may also explain to some extent, the evident difference between the common *ins* network and other common technology networks at Prosperous. For example, Ade, who in

previous chapters had defined the difference between Gamers and Internet people, shared that with friends in the Robotics club, he mostly uses instant message; much more than any other technology. He adds:

But usually if you can use... if you have their MSN, you use that over Facebook chat because Facebook chat is buggy and drops out... MSN is much better about it. MSN is more... robust (*Ade*).

I learned later that he actually used Trillian on his personal computer, and Meebo⁷⁴ on his iPod; both are applications that enable the user to access multiple chat clients from one single interface. Through these, he accessed his Google Talk, MSN, AIM, Yahoo messenger, and Twitter. Although he did use Facebook, he was proud of identifying its buggy-ness and of adopting more robust alternatives, as his eyes brightened and he was eager to share details about why and how he used instant messaging.

Instant messaging was not just a medium of communication for Ade and his techy friends. It was a medium for engaging in group discussions about technologies, and organizing into social meet-ups. For example, I asked him whether he had ever met new friends via different technologies:

Yeah... instant message. Let's see... You just talk to people and every once in a while someone makes a group—just a group conversation... just adds a whole bunch of people that they know and not necessarily that all the people within know... So then basically, is how my friend circle evolved last year... Let's see, so my friend Tim was... he just added a whole bunch of people to one group conversation and so I basically made friends with all of them just kind of Internet-wise, but I learned afterwards that I actually knew some of them from eighth grade... so it kind of made a really interconnected friend circle... Every time I meet a new friend, they actually know a whole bunch of my other friends... (*Ade*).

He remembered the experience vividly, which involved more than 10 people:

⁷⁴ Meebo has since been purchased by Google.

I'd actually call that a significant event right there. You know, an interconnected thing... Since it was a bunch of diverse people so there was just side conversations all happening at the same box. So you just have to follow people's names and stuff... You just have to follow which conversation is yours, and the conversation that I... it was just about computer parts and things... because of my friend Ash... he's going into server management at Cisco and stuff. So, we were talking about just hard computer parts, good gaming things... (Ade).

Instant messaging was part of a larger technology identity, which was further reinforced by the team projects and group decision-making enabled by STEM clubs:

Well, Tim was in Robotics last year and he had a lot of fun with it... He influenced me more that he was already in it so I knew someone in it and so that kind of - so you know someone in it. And Tad, he's one of my really good friends and last year we worked together with other people on a project for programming a video game for Microsoft competition and basically all those people became our Robotics team the next year.... And Tad was the leader of the programming team, so that's kind of why and we were like - it was kind of more a group thing - let's do this this year and try this out... we joined [the Robotics club] as one team (Ade).

And, the knowledge and experience in such structured group activities in STEM clubs no doubt contributed to the sense of belonging, confidence, and desire to influence the school that Ade and his friends had; thus illustrating the synergistic influences between social identity, activity involvement, social networks (friendships), and the social development of leadership and civic identities:

My kinda just group of really tech savvy kind of people, we have our own influence over the school... If you've seen the new reader board out there... none of the teachers have any idea how to do anything with it. We had to figure that out ourselves... Tad has been the tech person for this school since seventh grade. He got the leadership award in ninth grade for being the tech guy (Ade).

Circling back to the use of instant messaging, other interviewees at Prosperous used instant message, but when talking about it, the technology-identity was not there the way it was with Ade and his techy friends. In my read of literature regarding instant messaging, it has historical roots in the use of IRC (Internet Relay Chat) (Grinter & Palen, 2002), a protocol for live Internet text messaging that started in 1988, and used at the time by “techies” (Pingdom, 2012). Although Ade did not mention this history, I thought it would be worth pointing out, as it may help make sense of how initial preference for IM may have occurred as part of a larger network and long process of diffusion within the communities of technologically oriented people, but such use only flourished as part of the technology identity that the STEM social type clusters co-developed.

I should add that the technology identity amongst students involved in STEM activities at Prosperous also rendered itself visible in the types of Facebook groups that they created (e.g., to organize technology oriented activities such as “bring your Velociraptor to work day,” or sharing programming code. However, because students from other social types also used Facebook groups for other purposes, the relationship of *sns* did not stand out as much as *ins* did for the STEM oriented social types.

At Rising, while such technology-identity existed for some students, the lack of common activity settings may have prevented such identities to flourish through validation from other social types, and to diffuse to others with similar interests. For example, Phil, a self-identified Gamer and Nerd, also engaged in group chat (via Skype):

Like not including me, there’s a total of nine people... There’s people who used to be our friends, but moved away somewhere or graduated; and there’s people that we don’t know, but we know online... Well, it first started out where I just start talking to someone that I knew pretty well, and they introduced me to more friends and then I got those and those friends introduced me to more friends... They just host a phone call... not really a phone call, just like a regular call [he means Skype call], and then the host would invite more calls, and then I’d just talk with them and share contact details (*Phil*).

However, his group interactions via Skype had little to no overlap with any school activity contexts for his interests, knowledge, and energy towards technology and gaming to be translated into more positive experiences at school. As described earlier, at school, his friends met at the library, and their gaming activities were not school-related.

I do not think I am over-emphasizing the role of the Robotics club and STEM activities at Prosperous in creating common contexts for friendships, activity participation, and enabling technological and alternative identities to flourish. Sure, not every student involved in STEM can become the Vice-president like Tad did, but they had the social support and validation for valuing what they were good at. They wanted and knew they influenced the school. At Rising, where there was a dearth for STEM types of school clubs, I also observed a yearning for opportunities to realize technology interests and identities, as I discuss in the next section.

10.6.3. Yearning for opportunities to realize diverse interests, knowledge, and identities at Rising

At Rising, the lack of common domain-specific activities through which to elicit common technology interactions across social types is also attributable to the smaller number of school clubs. The smaller number of clubs may have contributed to the less obvious clustering of social types around common structured activities. At Rising, there were less variety of clubs than at Prosperous (24 vs. 34 active clubs), with Prosperous having many more service clubs (e.g., Key club, Cakes for a Cause, School for Schools, etc.) and domain-specific clubs (e.g., Robotics, Art, Exordium (another art club) Anime, Chess, Environmental Club, Digital multi-media, Science Olympiad, etc.). This dearth of domain-specific clubs at Rising created a vacuum which participants yearned to be filled. For example, several interview participants expressed being interested in technology development and/or gaming, but were either not in any school clubs or were in the only club which clearly distinguished itself from the school spirit types of activities—Drama. For example, when I asked them “are there any clubs related to programming, robotics, or stuff like that?” The responses I got were:

I wish... I really wish. It would have been an interesting class [students used club and class interchangeably] (*Phil*).

Yeah, I wish, but, no, not at our school... Yeah, I would love to have something like that. But our school doesn't really have anything like that. They're very limited in the whole clubs thing... I mean, I know that some other schools, like I have a few friends at Prosperous that have like a science club that puts together science projects for a science fair and a robotics club that builds robots for the robot competitions, and I think that would be really fun to actually do with groups of people. It's just we never had a club to do this (*Damon*).

There was also a sense that the school clubs available were vague and not specified towards anyone. For example, Sal was not involved in any school clubs because, in his own words: "I guess it doesn't really interest me that much." He seemed to have no passion towards anything in particular, but as he talked about how he used Facebook chat, he shared that he had discussed with peers immigration issues and the Arizona laws against immigration. It was evident that this was an issue he cared about. So, with an interest in gauging how he might consider engaging in school clubs or school-based activities, I asked Sal, if an adult at school invited him to help raise awareness on immigration issues (an issue that he had recently engaged in debate with friends), would that be of interest to him:

Yes, it would because it's like specified towards me. You're like really trying to get me into it. Not like, I guess, people who are talking about it. Or you can apply to this club and it's kind of like vague for anyone, so it's whatever (*Sal*).

This is not to say that every student will be reached by diverse domain-specific school clubs. First, a student's socio-economic status may require him/her to work most of the after school hours and limit their time available for school clubs. Second, some students are just "turned-off" by anything organized by the school:

Yeah, I'm not really into the whole school club thing. It's - I like being social and everything, but there's something that's a complete and total turn-off for it

to be a school organized club or sport. It's just like, it's - I guess it takes some of the fun out of it (*Brin*).

Sal's response and prior research lead me to believe that Brin's reaction to school clubs is a matter that can be addressed by supporting *sense of relatedness*, or a desire for connection, social validation, and belonging (Ryan & Deci, 2000). In another study of teens, Lin & Farnham (2013) found that most teens initiated their engagement in new activities through sense of relatedness (be it friends, respected adults, or more senior peers). For Brin, it may require some adult or teacher to identify first adult-friendly students to whom Brin and her s punk/rocker friends can relate, and through them start meet-ups, get-togethers, a rock-bam⁷⁵ or whatever term makes it sound less school-like. If I had to end this chapter with a moral or motto, it would be: "there should be a constructive domain-specific extracurricular activity for every adolescent.

⁷⁵ Bam is colloquial language typically referring to excitement, happiness, or as an adjective for awesome, cool, etc.

Part IV. Conclusion

Chapter 11. Summary and Implications

11.1. Summary

In a descriptive study, I compared across two high schools, the synergistic influences between adolescent social types, activity involvement, friendships, and technology mediated interactions, and paid particular attention to the Leadership class school spirit/civics types of activities. Surprisingly, my findings suggest that investing resources in diverse domain-specific school clubs such as Robotics and other STEM oriented activities which involve students from non-main stream subcultures may work hand in hand with strategies to promote teens' civic identities.

Specifically, I found that different school clubs not only attract different types of students, but when there are multiple school clubs within the same domain (e.g., STEM, school spirit, etc.) school clubs also provide the context through which students from different social types interact in person and via diverse technologies. Such common activity contexts may also contribute to the formation of domain-specific clusters of social types, through which students form networks of social relationships, reify social identities, develop self-esteem and desire to influence others, and co-create opportunities for participating in school Leadership activities (from school-wide leadership to small group influence). Such *domain specific activity clusters* may afford the use of particular types of technologies, and a technology's qualities may afford its usage in particular types of activities. Thus, the clusters of social types based on common activities may also be evidenced through the technology interactions (above a level of interaction) that students in two social types have with their shared friendships.

In contrast, where conventional school clubs exist (e.g., school spirit and Leadership, Honor Society, or languages), but there is a lack of variety and domain-specific school clubs for alternative social types (e.g., science, robotics, different types

of art, or ethnic groups), a *center-periphery divide* may be formed such that those engaged in the school spirit and leadership types of clubs are at the center and those engaged in other clubs or no clubs at all are at the periphery. The lack of common domain-specific activity contexts prevent: the formation of social relationships that reify alternative identities at the periphery, the development of self-esteem via the activities, and evident common technology interactions that distinguish sets of social types. Further, in a network with a center-periphery divide structure, the periphery may become disinterested in the central leadership activities, and may disengage from seeking opportunities to lead or influence the larger student body.

11.2. Implications for Educational Institutions, Organizations, Technology Design, and Research

What are the implications of these findings on practices within educational institutions (or other organizations), technology design, and research methods? I discuss these implications at a high level of abstraction.

11.2.1. Implications for schools and other organizations

Invest in diverse domain-specific school clubs. As suggested by my findings, school clubs or extracurricular participation can be critical in adolescents' social development, including the formation of friendships, identity validation across social types, and the development of leadership and civic identities. To prevent a center-periphery divide and the disinterest and disengagement from the periphery in school spirit and civics types of activities, it may be important for schools to invest in forming more domain-specific clubs that attract non-mainstream subcultures and alternative social types (i.e., social types that still conform to the values of education, and achievement, but do not conform to the social norms and values of the main-stream Populars; e.g., Internet) and oppositional social types (i.e., social types that reflect dissident values from those of the mainstream Popular; e.g., Punk, Gangster/Tough) (Garner, Bootcheck, Lorr & Rauch., 2006). In particular, since Nerd and geeky identities have been perceived as lower-status social types in some high schools, creating STEM types of clubs can be a priority well worth investing in, particularly given global trends and needs around STEM professions. Thus, by investing in such clubs, schools can

meet two ends with one strategy.

Distribute resources according to the observed social structure. Based on the social structure of both schools, the school with activity-based clusters (with clusters not completely disjoint from each other) also had students from different social types show interest in participating in the Leadership class. In contrast, the school with the center-periphery structure had students from social types at the periphery show complete disinterest in the Leadership class. Thus, the distribution of resources for school clubs could benefit most if planned alongside examination of the social structure of social types and of students' perceptions about social division and the Leadership class, as described in section 9.6.

Rotate the responsibility of organizing school wide assemblies and events across school clubs. As mentioned in Chapter 9, even with the benefits for identity development and social validation that domain-specific school clubs enable, unequal opportunities for school-wide leadership still exist, and yet such experiences can be crucial to the development of self-esteem and future civic participation. The responsibilities usually assigned to the Leadership class can be rotated across school clubs, such that each school club (or sets of clubs) determine the type of school-wide activity they would like to engage the student body. Football, sports, and royalty elections are great venues, but should not be the only ones deserving school-wide attention or requiring attendance from all students, especially if they contribute to an increasing gap between center and periphery's interest towards these venues.

Support sense of relatedness. Investing in school clubs may still not reach every student, as there are those who get "turned-off" by anything school-related. Thus, when planning for school clubs, it is important to consider diverse student social types, and devise strategies to reach alternative and oppositional social types; particularly those which tend to not be school-oriented, like the Emo, Punk/rocker, Smoker, and others whose social identities tend to contest conventional norms and values and be framed in opposition to dominant social types (Popular, Jock, Overachiever, Brain); thus termed "oppositional groups" by Garner et al. (2006). This is especially important since the

oppositional social types are more likely to be in danger of dropping out of school, and extracurricular activities provide ideal settings to reintegrate these social types and ensure they do not fall in the cracks of the educational and social system. Outside of schools, organizations may also benefit from considering sense of relatedness when planning and building communities of interest that integrate people in diverse network positions. For example, consider integrating alternative music with other constructive purposes (e.g., STEM or community service).

Consider whether a technology is perceived to be a private medium, the type of information, and type of social structure when and assessing the reach of a technology.

The social type structures I presented are about common activities and friendships, and the sharing of *social information* like values, norms, and practices, and not specifically about other types of information (e.g., web content, knowledge, etc.). Although such information can also be diffused across students through the observed structures, these structures were not about information diffusion and should not be used to assess information diffusion. This is because depending on the type of technology used and the type of information being diffused, the social structures presented do not guarantee the information flows will follow the paths in the observed structures. For example, gossips spread via multiple modes of communication and diffuse very differently (Borgatti, 2005) from say, understanding through lived experience, the difference between a Gamer and an Internet person—how they communicate, use technologies, and interact with others. My dissertation was about the latter and not about diffusing specific digital content across social types.

If the social structures presented were of a different nature, then issues about perceptions of a technology's privacy and sub-community usage preferences must be considered. For example, the general interest in how people use diverse technologies to communicate and share information may lead marketers and organizations to think in terms of identifying one technology that can reach the most people. Since texting was the most frequently used technology across students (i.e., has the highest average frequency of use), we might be inclined to think that messages sent via texting would have the broadest reach. Putting issues of privacy and appropriate intrusion aside (that

students—and adults—typically see texting as a medium reserved for close friends), my study shows that reaching the most does not guarantee that different types of students are reached. For one, different social types may have different technology preferences and practices or be disconnected from the rest. For another, there are broadcasting technologies, which although are not used the most frequently serve may serve the purpose of broad reach better.

Use ecological perspectives to measure educational outcomes. In my view, education is not just about the acquisition of skills, but also, about connecting people with settings, resources, social networks, and strategies to develop their social, professional, and civic selves, so that they can participate as responsible members of society. As extracurricular activities contribute to such developments, I advocate that measurements on educational outcomes adopt ecological perspectives on education, and assess: (a) the existence of diverse types of domain-specific extracurricular activities; (b) the support for sense of relatedness in school for diverse student types, especially students who identify with oppositional social types; (c) students' interest and opportunities in taking on leadership roles, either via the school government or Leadership class or other mechanisms; (d) the social structure of social types, school clubs, and friendship networks (mediated and unmediated)—to examine whether evident peripheries exist in the social structure (e.g., due to lack of school clubs or context to support the integration of students from particular social types; and (e) perceptions about social type divisions and involvement in leadership from students of diverse social types.

11.2.2. Implications for technology design

Based on findings, there is an opportunity to design for the preservation of technological boundaries that support sub-communities' needs to reify their group identity, while enabling them to remain connected to other communities through the same interface. However, such design opportunity ought to be assessed against the joint-affordances of the activity contexts within which technology interactions happen and of the technology's properties. In line with research on community resilience (Sonn

& Fisher, 1998), which finds that non-dominant sub-communities tend to develop processes and activities to protect aspects about their culture that they value, the STEM social types at Prosperous used instant messaging partly as a way to distinguish their tech-savvy identities and preserve their group boundary (from the popular use of social network sites). However, their sense of influence in school was only realized when positioned in relation to other social types. Thus, their connection to other social types, in person and via social network sites, was also an important part of their identity formation and their desire to influence school.

“Social media aggregators,” or technologies that gather content from diverse web applications and enable reading such content through one interface, capture the essence of enabling the existence of multiple technologies (or clients or brands of technologies) while easily allowing the user to not connect to all clients at any one point in time. For example, the old Tweetdeck, prior to May 2013, enabled reading status updates from Facebook, LinkedIn, and Twitter (Levine, 2012; Pachal, 2013). However, features like commenting or liking in Facebook could not be directly accessed through the Tweetdeck dashboard. This is understandable. Currently, social media applications are built on proprietary technology. The property owner or owner of the social media cannot prevent the aggregation of information available on the web (like status updates) if the user’s social media account and password are provided. However, the social media property owner has control over how content gets posted on their application. For a social media aggregator to also post or act as the interface through which users post to other social media, the aggregator would need the social media property owner to open his proprietary technology to interface with other social media.

The limited functionality of social media aggregators opens up opportunities to enhance their functionalities. Adding the ability to post and take actions on other social media via the aggregator’s interface is one such enhancement. I will refer to this as the *enhanced social media aggregator*. It offers an interface through which information from different social media and communication technologies can be read. In addition, posting and proprietary features in other social media can also be used through the enhanced social media aggregator (no need to exit the enhanced aggregator). The type

of features and functionalities from other social media to make available through the enhanced aggregator would be dynamically determined by the user's actions in relation to actions taken by similar users, or by the user's explicit indication to use such functionalities.

The current state of proprietary social media is such that there are many hurdles to overcome before the implementation of an enhanced social media aggregator is possible, such as the willingness of social media property owners to be more open. Nevertheless, the vision behind the "enhanced social media aggregator" is contrasted against proprietary technologies like Facebook, which want to be the one-stop solution to all. My study (and history) shows that alternative cultures may purposefully curtail mainstream dominance, not by fully disconnecting from the technologies the main stream uses, but by finding alternative mediums to form their own niche communities. More sophisticated privacy management solutions to separate social worlds may also not address the cultural processes and the needs that sub-groups have of validating their distinct social identity. For one, social media and communication technologies are relational. Even if the perfect social media enabled easy management of social worlds, such technology would be of no use if the user's network of friends does not use such technology. For example, some adolescents in my study expressed that they did not use Twitter much because none of their friends used it.

For another, as mentioned, the natural formation of alternative communities may mean that no matter how perfect a social media application is, people will find alternatives that protect the boundaries of their distinct identities. Thus, a social media property owner (e.g., Zuckerberg) may desire for their social media to be the one stop medium for people's socializing and communication needs, but they cannot prevent the natural formation of alternative communities who opt to adopt other technologies over said proprietary social media. Thus, making proprietary applications more open and facilitating their seamless blending with other social media may work to the advantage of the social media property owners. By being more open, and enabling more easy interfacing with enhanced social media aggregators, proprietary social media may

retain the serendipitous engagement of people who curtailed the use of it, but still have friendship networks on it.

My vision of an enhanced social media aggregator recognizes that there is value in not having one universal social media. There is value in letting designers and companies compete for market share because the “invisible hand⁷⁶” behind the supply of social media applications and end user’s appropriation of them will partially determine the actual use of an application. As my study shows, the more consistent use of some technologies in particular social type clusters was partly discretionary and partly determined by the joint-affordances of the activity and the technology (e.g., instant messaging for Robotics and clubs sharing common spaces, computer-based activities vs. texting for mobile activities like sports and school spirit events). That is, the activity, technology, and user jointly determine how the user will appropriate the technology. Thus, not only is it in the proprietary owners’ best interest to be more open and enable the seamless blending of different applications through aggregators, but also is it for a design process to include in-situ assessments of technology appropriation.

Support access and creation of distributed communities of interest. Not all schools can afford hosting multiple school clubs or have sufficient students of the same social type for it to be identified as one. A technology design direction could be to automate or crowd source the gathering of information about school clubs and their meeting times, gather students’ interest profiles, and create a “buddy system” where sets of student from one school are matched to sets of students from the hosting school to foster distributed participation, discussions, and engagement in the school clubs. This may work particularly well for STEM types of school clubs since students interested in these clubs may be more open to engaging in distributed participation in STEM types of clubs.

⁷⁶ In economics, the self-regulating mechanism behind the supply of demand of goods in the free market system is often described as the “invisible hand,” as coined by Adam Smith.

11.2.3. Methodological and research implications

Use social interaction data from more than one technology medium to make conclusions about social structure. My data shows that one source of technology mediated interaction data does not faithfully represent the actual social structure of entities in social space. Thus, current research on social media ought to limit its findings to that particular online space.

Perceptions about social types and their involvement in school clubs provide a good sense of whether social type clusters may exist. Based on the similar social structures I obtained via the common activities network (where social types were channeled by common school clubs and activities) and the common friendship networks (where social types were channeled by having a common set of friends), my study suggests that collecting data about people's perceptions of the school clubs in which social types are most active could be sufficient to provide a sense of the type of social structure that exists. This also validates that: (a) social type identities are about perceptions; and (b) friends' social types do illustrate respondents' social type identities.

Overlaps based on common friendships provide fair representations of the social structure of social types. Related to the point above, since the common friendships network reproduced similar structures to the common activities network, they validate each other to some extent. Such validation suggests that the analysis of how microsystems are related to each other which applies methods behind the "Duality of Persons and Groups" can be done with a small set of people from the larger social system. Further, this also validates the use of the "Duality of Persons and Groups" as a method to study social identity overlaps, as the method had primarily been validated for their study of people's membership to concrete collectivities (like official membership in an organization or club).

Identifying mid-level communities via distinct common technology interactions. Seeing clusters of networks via one technology but not another can be a starting point for identifying domain-specific communities across various groups. In an institution or

organization, if interactions across individuals exist above a level of interaction via one technology over another, it may be an indication of clusters based on common activities, or an indication of the type of activities that demand the use of particular technologies. If formalized groups or teams exist, the identified clusters can offer a sense of how these groups relate to each other. The identification of clusters based on common activities may also be particularly useful when data can be collected about people's communication patterns via diverse technologies, but direct surveys about their activity preferences cannot be obtained.

REFERENCES

- Anheier, H. K. (2004). *Civil society: measurement, evaluation, policy*. London, UK: Earthscan.
- Barron, B. (2006). Interest and self-sustained learning as catalysts of development: A learning ecology perspective. *Human Development*, 49(4), 193-224.
- Bartko, W. T., & Eccles, J. S. (2003). Adolescent participation in structured and unstructured activities: A person-oriented analysis. *Journal of Youth and Adolescence*, 32(4), 233-241.
- Beal, S., & Crockett, L. (2010). Adolescents' occupational and educational aspirations and expectations: Links to high school activities and adult educational attainment. *Faculty Publications, Department of Psychology*. Retrieved from <http://digitalcommons.unl.edu/psychfacpub/491>
- Bogardus, E. S. (1925). Measuring social distance. *Journal of Applied Sociology*, 9(January-February), 299-308.
- Borgatti, S. P. (1997). *Multidimensional scaling*. Retrieved from <http://www.analytictech.com/borgatti/mds.htm>
- Borgatti, S. P. (2005). Centrality and network flow. *Social Networks*, 27(1), 55-71.
- Borgatti, S.P., Everett, M.G., and Freeman, L.C. (2002). *UCINET 6 for Windows: Software for Social Network Analysis*. Harvard: Analytic Technologies.
- boyd, D.M. (2004). Friendster and publicly articulated social networking. In *CHI '04 Extended Abstracts on Human Factors in Computing Systems* (pp. 1279-1282). New York, NY, USA: ACM. doi:10.1145/985921.986043
- boyd, D.M. (2006). Friends, Friendsters, and Myspace top 8: Writing community into being on social network sites. *First Monday*, 11(12-4).
doi:<http://dx.doi.org/10.5210/2Ffm.v11i12.1418>
- boyd, D.M. (2007). Why Youth (Heart) Social Network Sites: The Role of Networked Publics in Teenage Social Life. In D. Buckingham (Ed.), *Youth, Identity, and Digital Media* (pp. 119-142). Rochester, NY: Social Science Research Network. doi: 10.1162/dmal.9780262524834.119

- boyd, D. M. (2009). *Taken out of context/ American teen sociality in networked publics*. (Doctoral dissertation) University of California, Berkeley. Retrieved from <http://gradworks.umi.com/33/53/3353116.html>
- boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1), 210–230.
- Bradner, E., & Mark, G. (2002). Why distance matters: effects on cooperation, persuasion and deception. In *Proceedings of the 2002 ACM Conference on Computer Supported Cooperative Work* (pp. 226–235). New York, NY, USA: ACM.
doi:10.1145/587078.587110
- Breiger, R. L. (1974). The duality of persons and groups. *Social forces*, 53(2), 181–190.
- Brief guide to using Netdraw* (n.d.) Analytic Technologies. Retrieved from <http://www.analytictech.com/netdraw/netdrawguide.doc>
- Brown, B. B. (1990). Peer groups and peer cultures. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 171–196). Cambridge, MA: Harvard University Press.
- Brown, B. B., & Steinberg, L. (1990, March). Striking the “Brain-Nerd” connection: Academic achievement and social acceptance. *The Education Digest*, 55(7), 57–60.
- Burrell, G., & Morgan, G. (1979). *Sociological paradigms and organisational analysis: elements of the sociology of corporate life*. Heinemann.
- Burt, R. S. (2001). Structural holes versus network closure as social capital. In N. Lin, K. Cook, & R. S. Burt (Eds.), *Social capital: Theory and research* (pp. 31–56). New Brunswick, New Jersey: Transaction Publishers.
- Caracelli, V. J., & Greene, J. C. (1997). Crafting mixed-method evaluation designs. *New Directions for Evaluation*, 1997(74), 19–32. doi:10.1002/ev.1069
- Coleman, J. S. (1981). *Adolescent society: The social life of the teenager and its impact on education*. Westport, CT: Greenwood Publishing Group, Incorporated.
- Cooley, C. H. (1902/1992). *Human Nature and the Social Order*. Transaction Publishers.
- Creswell, J. W. (2004). Mixed methods designs. In *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2nd ed., pp. 509–548). Prentice Hall.

- Creswell, J. W., & Plano Clark, V. L. (2010). *Designing and conducting mixed methods research*. SAGE.
- DeJordy, R., Borgatti, S. P., Roussin, C., & Halgin, D. S. (2007). Visualizing proximity data. *Field Methods*, 19(3), 239–263. doi:[10.1177/1525822X07302104](https://doi.org/10.1177/1525822X07302104)
- DiMicco, J. M., & Millen, D. R. (2007). Identity management: multiple presentations of self in facebook. In *Proceedings of GROUP'07 International ACM Conference on Supporting Group Work* (pp. 383–386).
- Eccles, J. S., & Barber, B. L. (1999). Student council, volunteering, basketball, or marching band. What kind of extracurricular involvement matters? *Journal of Adolescent Research*, 14(1), 10–43. doi:10.1177/0743558499141003
- Eccles, J. S., Barber, B. L., Stone, M., & Hunt, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues*, 59(4), 865–889.
- Elliott, G. R., & Feldman, S. S. (1990). Capturing the adolescent experience. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 1–13). Cambridge, MA: Harvard University Press.
- Fredricks, J. A., & Eccles, J. S. (2005). Developmental benefits of extracurricular involvement: Do peer characteristics mediate the link between activities and youth outcomes? *Journal of Youth and Adolescence*, 34(6), 507–520.
- Garner, R., Bootcheck, J., Lorr, M., & Rauch, K. (2006). The adolescent society revisited: Cultures, crowds, climates, and status structures in seven secondary schools. *Journal of youth and adolescence*, 35(6), 1023–1035.
- Goffman, E. (1959). The presentation of self in everyday life. *New York: Anchor Doubleday*, 212.
- Greene, J. C. (2012). Engaging critical issues in social inquiry by mixing methods. *American Behavioral Scientist*, 56(6), 755–773. doi:10.1177/0002764211433794
- Greenhow, C., & Robelia, B. (2009). Informal learning and identity formation in online social networks. *Learning, Media and Technology*, 34(2), 119–140.
- Grinter, R. E., & Palen, L. (2002). Instant messaging in teen life. In *Proceedings of the 2002 ACM Conference on Computer Supported Cooperative Work* (pp. 21–30). New York, NY, USA: ACM Press. doi:10.1145/587078.587082

- Hanks, M. (1981). Youth, voluntary associations and political socialization. *Social Forces*, 60, 211-223. Retrieved April 4, 2006, from <http://www.jstor.org>
- Hannan, M. T., & Freeman, J. (1977). The population ecology of organizations. *American Journal of Sociology*, 82(5), 929-964. doi:10.2307/2777807
- Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California, Riverside. Retrieved from <http://faculty.ucr.edu/~hanneman/nettext/>
- Hansell, S. (1985). Adolescent friendship networks and distress in school. *Social Forces*, 63(3), 698-715.
- Haythornthwaite, C., & Wellman, B. (1998). Work, friendship, and media use for information exchange in a networked organization. *Journal of the American Society for Information Science*, 49(12), 1101-1114. doi: 10.1002/(SICI)1097-4571(1998)49:12<1101::AID-ASI6>3.0.CO;2-Z
- Hogan, B. (2010). The presentation of self in the age of social media: distinguishing performances and exhibitions online. *Bulletin of Science, Technology & Society*, 30(6), 377-386.
- Horn, S. S. (2003). Adolescents' reasoning about exclusion from social groups. *Developmental Psychology*, 39(1), 71-84. doi:10.1037/0012-1649.39.1.71
- Howe, K. R. (1988). Against the quantitative-qualitative incompatibility thesis or dogmas die hard. *Educational Researcher*, 17(8), 10-16.
- Isaacs, E., Szymanski, M., Yamauchi, Y., Glasnapp, J., & Iwamoto, K. (2012). Integrating local and remote worlds through channel blending. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work* (pp. 617-626). New York, NY, USA: ACM. doi:10.1145/2145204.2145299
- Ito, M., Baumer, S., Bittanti, M., Boyd, D., Cody, R., Herr, B., ... Martinez, K. (2009). *Hanging out, messing around, geeking out: Living and learning with new media*. Cambridge: MIT Press.
- Kandel, D. B. (1978). Homophily, selection, and socialization in adolescent friendships [Electronic Version]. *The American Journal of Sociology*, 84, 427-436. Retrieved Feb. 5, 2007 from <http://www.jstor.org>.

- Kandel, D. B. (1985). On processes of peer influences in adolescent drug use: A developmental perspective. *Advances in Alcohol & Substance Abuse*, 4(3-4), 139-162. doi:10.1300/J251v04n03_07
- Kandel, D. B., & Lesser, G. S. (1969). Parental and peer influences on educational plans of adolescents. *American Sociological Review*, 213-223.
- Kaplan, A. (1998). *The conduct of inquiry: Methodology for behavioral science*. Transaction Publishers.
- Kazeniac, A. (2009). Social networks: Facebook takes over top spot, Twitter climbs. *Consumer insights for digital marketers*. Retrieved from <https://blog.compete.com/2009/02/09/facebook-myspace-twitter-social-network/>
- Kieselbach, T. (2003). Long-term unemployment among young people: the risk of social exclusion. *American Journal of Community Psychology*, 32(1-2), 69-76.
- Kim, H., Kim, G. J., Park, H. W., & Rice, R. E. (2007). Configurations of relationships in different Media: FtF, email, instant messenger, mobile phone, and SMS. *Journal of Computer-Mediated Communication*, 12(4), 1183-1207.
- Kobourov, S. G. (2013). Force-directed drawing algorithms. In R. Tamassia (Ed.), *Handbook of Graph Drawing and Visualization* (pp. 383-408). CRC Press. Retrieved from <http://cs.brown.edu/~rt/gdhandbook/chapters/force-directed.pdf>
- Lange, P. G., & Ito, M. (2010). Creative production. In *Hanging out, messing around, and geeking out: Kids living and learning with new media* (pp. 243-293). The MIT Press.
- Lenhart, A., Hiltin, P., & Madden, M. (2005). *Teens and Technology* (Teens, email). Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org/Reports/2005/Teens-and-Technology.aspx>
- Lenhart, A., Madden, M., & Hitlin, P. (2005). Teens and Technology: Youth are leading the transition to a fully wired and mobile nation. *Specialist*. Pew Internet & American Life Project. Retrieved from http://www.pewinternet.org/pdfs/PIP_Teens_Tech_July2005web.pdf
- Lenhart, A., Madden, M., Smith, A., & MacGill, A. R. (2009). *Teens and social media: An overview*. Pew Internet & American Life Project.

- Levine, B. (2012, July 3). Twitter Ends Two-Way Street with LinkedIn. *CMSWire.com*. Retrieved June 14, 2013, from <http://www.cmswire.com/cms/social-business/twitter-ends-twoway-street-with-linkedin-016371.php>
- Lewis, K., Kaufman, J., & Christakis, N. (2008). The taste for privacy: An analysis of college student privacy settings in an online social network. *Journal of Computer-Mediated Communication*, 14(1), 79-100.
- Lin, N. (2008). A network theory of social capital. *The handbook of social capital*, 50-69.
- Lin, P., & Farnham, S. (2013). Opportunities via extended networks for teens' informal learning. In *Proceedings of the 2013 Conference on Computer Supported Cooperative Work, CSCW '13* (pp. 1341-1352). ACM Press. doi:[10.1145/2441776.2441927](https://doi.org/10.1145/2441776.2441927)
- McMorris, B. J., Clements, J., Evans-Whipp, T., Gangnes, D., Bond, L., Toumbourou, J. W., & Catalano, R. F. (2004). A Comparison of methods to obtain active parental consent for an international student survey. *Evaluation Review*, 28(1), 64-83. doi:10.1177/0193841X03257532
- McNeal Jr, R. B. (1998). High school extracurricular activities: Closed structures and stratifying patterns of participation. *The Journal of Educational Research*, 91(3), 183-191.
- Mead, A. 1992. Review of the development of multidimensional scaling methods. *Journal of the Royal Statistical Society. Series D (The Statistician)* 41(1):27-39. Retrieved July 18, 2012.
- Mead, M. (1973). The art and technology of field work. In R. Narroll & R. Cohen (Eds.), *A handbook of method in cultural anthropology* (pp. 246-65). New York: Columbia University Press.
- Miller, C. C. (2009, August 26). Who's driving Twitter's popularity? Not teens. *The New York Times*. Retrieved from http://www.nytimes.com/2009/08/26/technology/internet/26twitter.html?_r=0
- Mills, A., Chen, R., Lee, J., & Rao, H. R. (2009). Web 2.0 emergency applications: how useful can twitter be for emergency response. *Journal of Information Privacy & Security*, 5(3), 3-26.

- Monroy-Hernández, A., Hill, B. M., Gonzalez-Rivero, J., & boyd, D. (2011). Computers can't give credit: how automatic attribution falls short in an online remixing community. In *Proceedings of the CHI'11 Conference on Human Factors in Computing Systems* pp. 3421–3430). Vancouver, BC, Canada: ACM.
doi:10.1145/1979442.1979452
- Morgan, W., & Streb, M. (2001). Building citizenship: How student voice in service-learning develops civic values. *Social Science Quarterly*, 82(1), 154–169.
doi:10.1111/0038-4941.00014
- Muuss, R. E. H. (1988). Friendship patterns and peer group influences: An ecological perspective based on Bronfenbrenner, Kandel, and Dunphy. In *Theories of adolescence* (5th edition., pp. 300–319). McGraw-Hill New York.
- Muuss, R. E. H., (1996a). Erik Erikson's theory of identity development. In *Theories of adolescence* (pp. 42–57). McGraw-Hill New York.
- Muuss, R. E. H. (1996b). An anthropological perspective of adolescence. In *Theories of adolescence* (pp. 362–386). McGraw-Hill New York.
- National Model United Nations <http://www.nmun.org/ncca.html>
- Norman, D.A. (1999). Affordance, conventions, and design. *Interactions* 6, 3, 38–43.
- Offer, D., & Offer, J. B. (1975). *From teenage to young manhood: A psychological study*. New York: Basic Books, Inc, Publishers.
- Pachal, P. (2013, May 6). TweetDeck Ends Support for Facebook Tuesday. *Mashable*. Retrieved June 14, 2013, from <http://mashable.com/2013/05/06/tweetdeck-facebook/>
- Park, R. E. (1924). The concept of Social Distance as applied to the study of racial attitudes and racial relations. *Journal of Applied Sociology*, 8(6), 339–344.
- Pingdom. (2012, April 24). IRC is dead, long live IRC. *Royal Pingdom*. Retrieved from <http://royal.pingdom.com/2012/04/24/irc-is-dead-long-live-irc/>
- R Project (n.d.). <http://www.r-project.org>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. doi:[10.1037/0003-066X.55.1.68](https://doi.org/10.1037/0003-066X.55.1.68)

- Settersten Jr, R. A., & Ray, B. (2010). What's going on with young people today? The long and twisting path to adulthood. *The Future of Children, Transition to Adulthood* 20(1), 19-41.
- Shiels, M. (2009, June 26). Web slows after Jackson's death. *BBC News*. Retrieved from <http://news.bbc.co.uk/2/hi/8120324.stm>
- Simmel, G. (1971). The stranger. In D. N. Levine (Ed.), *On individuality and social forms: Selected writings* (pp. 143-149). University of Chicago Press Chicago.
- Simon, H. A. (1969/1996). *The sciences of the artificial* (3rd ed.). The MIT Press.
- Simpson, W. (2001, March 12). *The Quadratic Assignment Procedure (QAP)*. Presented at the STATA User Group, First North American meeting, Boston, MA. Retrieved from <http://www.stata.com/meeting/1nasug/simpson.pdf>
- Small, M. L. (2009). 'How many cases do I need?'. *Ethnography*, 10(1), 5 -38.
doi:[10.1177/1466138108099586](https://doi.org/10.1177/1466138108099586)
- Smetana, J. G., Campione-Barr, N., & Metzger, A. (2006). Adolescent Development in Interpersonal and Societal Contexts. *Annual Review of Psychology*, 57(1), 255-284.
doi:[10.1146/annurev.psych.57.102904.190124](https://doi.org/10.1146/annurev.psych.57.102904.190124)
- Smirnov, A. (2002, January 23). Scientists Stretching Adolescence into Thirties. *Ethicsdaily.com*. Retrieved from <http://www.ethicsdaily.com/scientists-stretching-adolescence-into-thirties-cms-232>
- Snyder, M., Tanke, E. D., & Berscheid, E. (1977). Social perception and interpersonal behavior: On the self-fulfilling nature of social stereotypes. *Journal of Personality and Social Psychology*, 35(9), 656-666.
- Sonn, C. C., & Fisher, A. T. (1998). Sense of community: Community resilient responses to oppression and change. *Journal of Community Psychology*, 26(5), 457-472.
doi:[10.1002/\(SICI\)1520-6629\(199809\)26:5<457::AID-JCOP5>3.0.CO;2-O](https://doi.org/10.1002/(SICI)1520-6629(199809)26:5<457::AID-JCOP5>3.0.CO;2-O)
- Sorokin, P. A. (1927). *Social mobility* (Vol. 3). Taylor & Francis.
- Steyvers, M. 2002. Multidimensional scaling. *Encyclopedia of cognitive science*. Retrieved July 18, 2012
(<http://onlinelibrary.wiley.com/doi/10.1002/0470018860.s00585/full>).
- Tajfel, H. (2010). Introduction. In *Social identity and intergroup relations* (Vol. 7, pp. 1-11). Cambridge University Press.

- Teddlie, C., & Tashakkori, A. (2012). Common “core” characteristics of mixed methods research A review of critical issues and call for greater convergence. *American Behavioral Scientist*, 56(6), 774–788. doi:10.1177/0002764211433795
- Van Linden, J. A., & Fertman, C. I. (1998). *Youth leadership: A guide to understanding leadership development in adolescents*. Jossey-Bass San Francisco, CA.
- Verba, S., Schlozman, K. I., & Brady, H. E. (1995). *Voice and equality: Civic voluntarism in American politics*. Cambridge, MA: Harvard University Press.
- Wasserman, S., & Faust, K. (1994). *Social network analysis methods and applications (Structural analysis in the social sciences)*. Cambridge University Press.
- Whitbred, R. (2011). Quadratic assignment procedure (QAP). In G. Barnett (Ed.), *Encyclopedia of social networks*. (pp. 733-735). Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781412994170.n301
- Youniss, J., McLellan, J. A., & Yates, M. (1997). What we know about engendering civic identity. *The American Behavioral Scientist*, 40(5), 620- 631. Retrieved April 4, 2006, from doi:10.1177/0002764297040005008

APPENDICES

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Lin, Peyina (2013). *Channeling Friendships across Social Types via Mediated Communication and High School Clubs*. (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (Accession Order Number. [number]).

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Appendix 2. School Clubs Describing Social Types

Prosperous High			Rising High		
Social Type	School Clubs	Total (%)	Social Type	School Clubs	Total (%)
1: Artsy		10 (100%)	1: Artsy		8 (100%)
	Arts & music Art (5) Music (2) Service clubs: SIFF Animal club Firehouse teen center	7 (70%) 3 (30%)		Arts & music Art (1) Drawing (1) Drama club (2) Band (1) Literary magazine (1) Sports (1) Other Hanging out (1)	5 (63%) 1 (13%) 1 (13%) 1 (13%)
14: Performer		10 (100%)	14: Performer		10 (100%)
	Arts & music Drama (4) Theater (1) Thespian board (1) Music (2) Choir (1) Sport Dancing (1)	9 (90%) 1 (10%)		Art & Music Drama (5) Band (2) Choir (2) Concerts (1)	10 (100%)
3:Brain		22 (100%)	3: Brain		30 (100%)
	Academic & STEM Robotics (4) Honor Society (3) Knowledge Bowl (3) Science Olympiad (3) Math (2) Physics (1) Debate (1) Sports (2) Volunteer (1) Not sure (2)	17 (77%) 2 (9%) 1 (5%) 2 (9%)		Academic & STEM Honor Society (4) Math (2) Debate team (1) Homework (1) Language clubs Language clubs (3) Japanese club (2) Diversity clubs MUN (5) School spirit/civics Leadership (2) ASB (2) Cabinet (1) Arts & Music Band (2) Drama (2) Gaming Chess club (1) Gaming (1) Other Sleeping (1)	8 (27%) 5 (17%) 5 (17%) 5 (17%) 4 (13%) 2 (7%) 1 (3%)
12:Overachiever		16 (100%)	12:Overachiever		8 (100%)
	Academic Honor society (5) AP (3) DECA (2) Math (1) School spirit/civics Leadership (2) Org. assemblies (1) Service Key club (1) RAKE (1)	11 (69%) 3 (19%) 2 (13%)		Academic AP (1) Honor Society (1) School spirit/civics ASB (1) Cabinet (1) Language clubs Spanish (1) Diversity clubs MUN (1) Music Band (1) Sports (1)	2 (25%) 2 (25%) 1 (13%) 1 (13%) 1 (13%) 1 (13%)

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Prosperous High			Rising High		
Social Type	School Clubs	Total (%)	Social Type	School Clubs	Total (%)
2: Average		111 (100%)	2: Average		153 (100%)
	Sports	39 (35%)		Sports	61 (40%)
	Sports (23)			Sports (39)	
	Soccer (4)			Soccer (6)	
	Tennis (4)			Tennis (5)	
	Track (3)			Basketball (3)	
	Football (2)			Football (3)	
	Swimming (2)			Track (2)	
	Ping pong (1)			Badminton (1)	
	Service	23 (21%)		Bowling (1)	
	Key club (8)			Cross country (1)	
	School for schools (5)			School spirit/civics	18 (12%)
	Volunteering (3)			Cabinet (11)	
	Animal club (2)			Leadership (4)	
	Cakes for a cause (1)			ASB (2)	
	Environmental club (1)			School spirit (1)	
	SIFF (1)			School clubs	10 (7%)
	SPAM (1)			School clubs (6)	
	Youth committee (1)			Average club (2)	
	Nothing	10 (9%)		After school clubs (1)	
	Hanging out (6)			Any (1)	
	None (3)			Art & Music	7 (5%)
	Not sure (1)			Band (6)	
	School clubs (5)	8 (7%)		Drama (1)	
	Academic & STEM	6 (5%)		Language clubs	7 (5%)
	Honor society (3)			Spanish (4)	
	Debate (1)			Language clubs (2)	
	Math (1)			Japanese Club (1)	
	Robotics (1)			Gaming & Technology	6 (4%)
	School spirit/civics	4 (4%)		Gaming (4)	
	School spirit (2)			MySpace.Facebook (2)	
	Leadership (2)			Academic	5 (3%)
	Arts & music	4 (4%)		Honor Society (4)	
	Music (2)			AP (1)	
	Art (1)			Diversity clubs	3 (2%)
	Band (1)			Multicultural club (1)	
	Professional development	4 (4%)		GSA (2)	
	Working (3)			Partying (3)	3 (2%)
	DECA (1)			Journalism	2 (1%)
	Gaming	3 (3%)		Yearbook (2)	
	Gaming (3)			Religion	2 (1%)
	Diversity clubs	1 (1%)		Bible (1)	
	GSA (1)			Church (1)	
				Service	1 (1%)
				Earth corp (1)	
				Drugs & alcohol	1 (1%)
				Smoking (1)	
				Professional development:	1 (1%)
				Working (1)	
				Other	26 (17%)
				Hanging out (11)	
				Socializing (1)	
				Talk (1)	
				Eating (1)	
				Sitting (1)	
				Sleeping (1)	
				None (6)	
				NA (2)	
				Not sure (2)	

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Prosperous High			Rising High		
Social Type	School Clubs	Total (%)	Social Type	School Clubs	Total (%)
15: Popular		98 (100%)	15: Popular		171 (100%)
	Sports Sports (21) Football (18) Basketball (5) Soccer (2) Baseball (1) Ping pong (2) Rowing (1)	50 (51%)		Sports Football (38) Sports (24) Basketball (7) Dance (3) Soccer (2) Volleyball (1) Golf (1) Ping pong (1) Football games (1)	78 (46%)
	School spirit/civics Leadership (8) Cheerleading (8) Superfans (7) ASB (4)	27 (28%)		School spirit/civics Cheerleading (39) ASB (15) Leadership (8) School spirit (3) Cabinet (2)	67 (39%)
	Partying Partying (5) Dancing (1)	6 (6%)		Academic Honor Society (7)	7 (4%)
	Drugs, alcohol Drinking (1) Drugs (1)	2 (2%)		Partying (6) Arts & music Band (2) Drama (1) Music (1)	6 (4%) 4 (2%)
	Academic Honor society (2)	2 (2%)		Sports fans	1 (1%)
	Journalism Newspaper (1)	1 (1%)		Language clubs Japanese club (1)	1 (1%)
	Arts & music Drama (1)	1 (1%)		Journalism Yearbook (1)	1 (1%)
	Service SPAM (1)	1 (1%)		Drugs & alcohol Drinking (1)	1 (1%)
	Other Fashion (1) Hanging out (1) Talking (1) Hobbies (1) Sex (1) Gaming (1) None (2)	8 (8%)		Other Hanging out (3) NA (2) None (1)	6 (4%)
115: Superfans		4 (100%)	---	----	----
	Sports fans Basketball games (1) Football games (1) Superfanning (1) None (1)	3 (75%) 1 (25%)		---	
38: Whites		2 (100%)	---	----	----
	School spirit/civics ASB (1) Soccer (1)	1 (50%) 1 (50%)		---	
---	---	---	140: Soccer player		2 (100%)
	---			Sports Soccer (2)	2 (100%)

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Prosperous High		
Social Type	School Clubs	Total (%)
8:Jock		26 (100%)
	Sports Football (9) Sports (4) Baseball (3) Basketball (3) Soccer (1) Rowing (1) Out of school sports (1) Some sports (1) Watch sports (1) School spirit/civics ASB (1) Leadership (1)	24 (92%)
		2 (8%)
13:Partyer		99 (100%)
	Sports Sports (23) Basketball (7) Football (4) Soccer (1) Powderpuff football (1) Longboarding (1) Ping pong (1) Some sports (1) School spirit/civics Superfans (15) Leadership (7) ASB (3) Drugs & alcohol Drinking (5) Drugs (2) Drug dealing (1) Smoking (1) Sports fans Football games (4) Basketball games (3) Partying Partying (6) Dancing (1) Academic Debate (1) Art & music Drawing, painting (1) Other Other (2) Friend centered (1) Eating (1) Sleeping (1) None (4) Not sure (1)	39 (39%)
		25 (25%)
		9 (9%)
		7 (7%)
		7 (7%)
		1 (1%)
		1 (1%)
		10 (10%)

Rising High		
Social Type	School Clubs	Total (%)
8: Jock		72 (100%)
	Sports Football (22) Sports (10) Basketball (6) Soccer (4) Baseball (3) Wrestling (2) Ratball club (1) Volleyball (1) Bowling (1) Ping pong (1) Badminton (1) Working out (1) Dance (1) School spirit/civics Cheerleading (4) School spirit (3) ASB (2) Leadership (1) Football games (1) Journalism Newspaper (1) Other Hanging out (1) Jerks (1) NA (2) Not sure (2)	54 (75%)
		11 (15%)
		1 (1%)
		6 (8%)
13: Partyer		44 (100%)
	Sports Sports (4) Basketball (4) Football (2) Partying Partying (3) After parties (3) Sports fans Football games (4) Basketball games (1) School spirit/civics Leadership (3) Cheerleading (1) Drugs & alcohol Drinking (2) Smoking (1) Arts & music Choir (1) Drama (1) Academic Honor society (1) Journalism Yearbook (3) Language clubs Spanish (1) Diversity club MUN (1) Other Any (4)	10 (23%)
		6 (14%)
		5 (11%)
		4 (9%)
		3 (7%)
		2 (5%)
		1 (2%)
		3 (7%)
		1 (2%)
		1 (2%)
		4 (9%)

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Prosperous High			Rising High		
Social Type	School Clubs	Total (%)	Social Type	School Clubs	Total (%)
5:Floater		28 (100%)	5: Floater		50 (100%)
	Sports Sports (5) Ping pong (1) Running (1) School spirit/civics Leadership (4) ASB (1) Cheerleading (1) Arts & music Drama (2) Art (1) Orchestra (1) Other School clubs (3) None (1) Service Animal club (1) Key club (1) RAKE (1) Journalism Writing (1) School magazine (1) STEM Computers (1) Robotics (1)	7 (25%) 6 (21%) 4 (14%) 4 (14%) 3 (11%) 2 (7%) 2 (7%)		Academic Honor Society (6) AP (5) School spirit/civics Cabinet (5) Leadership (3) Student senate (1) School spirit (1) Music Band (1) Drama (1) Sports Sports (12) Basketball (2) Football (2) Cross country (1) Track (1) School clubs (4) Diversity clubs GSA (1) Gaming (1) Other Lunch club (1) Hanging out (1) Random activities (1)	11 (22%) 10 (20%) 2 (4%) 18 (36%) 4 (8%) 1 (2%) 1 (2%) 3 (6%)
6:Gamer		15 (100%)	6: Gamer		10 (100%)
	Gaming & Technology Gaming (8) Electronics (2) Robotics (1) LAN parties (1) Art Art (1) None (2)	12 (80%) 1 (7%) 2 (13%)		Gaming & Technology Gaming (5) Pig mask army (1) Chess club (1) Sports Pick up basketball/football (1) Wrestling (1) Other Sleeping (1)	7 (70%) 2 (20%) 1 (10%)
---	---	---	11: Nerd		10 (100%)
				Academic Homework (2) Reading (2) Gaming & Tech Gaming (4) Language clubs Japanese club (1) Sports Tennis (1)	4 (40%) 4 (40%) 1 (10%) 1 (10%)
103: Internet		6 (100%)	---	---	---
	Gaming & Technology Internet (2) Robotics (2) Gaming (1) None (1)	5 (83%) 1 (20%)		---	

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Prosperous High			Rising High		
Social Type	School Clubs	Total (%)	Social Type	School Clubs	Total (%)
31: Asian		2 (100%)	31: Asians		6 (100%)
	Academic & STEM Honor society (1) Math (1)	2 (100%)		Language clubs Japanese club (2) Gaming Playing cards in library (1) Sports Dance (1) Other Hanging out (1) Talk (1)	2 (33%) 1 (17%) 1 (17%) 2 (33%)
9:Latino		2 (100%)	9: Latino		2 (100%)
	Diversity clubs Cultural club (1) Latino club (1)	2 (100%)		Sports Soccer (1) Language clubs Spanish (1)	1 (50%) 1 (50%)
32: Mexican		2 (100%)	---	---	---
	Diversity clubs Cultural club (1) Latino club (1)	2 (100%)			
17: Punk rocker		2 (100%)	17: Punk rocker		4 (100%)
	None (2)	2 (100%)		Arts & music Concerts (1) Music (1) Guitar club (1) Drama (1)	4 (100%)
---	---	---	4: Emo		2 (100%)
	---			Music Bands (1) Music (1)	2 (100%)
18: Skateboarder	None (2)	2 (100%)	---	---	---
10:Loner	Cross country (1) Track (1)	2 (100%)	---	---	---
---	---	---	16: Religious		4 (100%)
	---			Religion Bible (1) Music Band (1) Academic Honor Society (1) Sports (1)	1 (25%) 1 (25%) 1 (25%) 1 (25%)
---	---	---	131: Outcasts		2 (100%)
	---			Sports (1) School spirit/civics ASB (1)	1 (50%) 1 (50%)
---	---	---	132: Weird		2 (100%)
	---			Sports Wrestling (1) Tennis (1)	2 (100%)
---	---	---	20: Tough		2 (100%)
	---			Violence Street fighting (1) Other Hanging out (1)	1 (50%) 1 (50%)

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Prosperous High			Rising High		
Social Type	School Clubs	Total (%)	Social Type	School Clubs	Total (%)
19: Smoker		5 (100%)	19: Smoker		20 (100%)
	None (5)	5 (100%)		Drugs & alcohol	7 (35%)
				Drugs (2)	
				Smoking (2)	
				Dealing (1)	
				Drinking (1)	
				Partying (1)	1 (5%)
				Service	1 (5%)
				Earth corp (1)	
				Sports	1 (5%)
				Skateboarding (1)	
				Other	11 (55%)
				None (6)	
				Eating (2)	
				Not sure (2)	
				Sitting (1)	

Notes to this Appendix

1. What the columns mean:

In the first column, the numbers to the left of the social type label are social type codes which are later used in other visualizations. In the second column, clubs are organized based on broad categories (see point 3 below for the logic behind such organization). The third column “Total” is the total number of clubs that respondents provided to describe the social type (this total aggregates the clubs used to describe the same social type whether it was a central social type or a respondent’s social type. The larger numbers for some social types match the central social types illustrated in Figure 7-1 (Chapter 7)—the Central Social Types. The reason for which I aggregated respondents’ social types and Central Social Types was to enable viewing how school clubs connected different social types (see Figures 8-3 and 8-4 in Chapter 8).

2. School Club Acronyms and explanation of some clubs:

Cabinet: the representatives from each grade level at Rising who participate in the Leadership class, typically as behind the scenes helpers (e.g., decorate school parties, clean up, set up, help with fundraising, etc.). At Prosperous, the equivalent term is “class representatives,” but respondents did not use such term to describe social types (the questions were open ended—no restrictions at all).

DECA (Delta Epsilon Chi and Distributive Education Clubs of America): An international association of high school and college students and teachers of marketing, management, and entrepreneurship in business, finance, hospitality, and marketing sales and service.

Earth corps: an environmental club (Rising High only).

Environmental Club: Club which implements environmental changes at the school using environmental friendly energy sources, recycling, etc. (Prosperous High only).

GSA (Gay Straight Alliance): A national youth organization that aims at creating safe environments to learn about homophobia, transphobia, and other oppressions.

Key Club: A service program for high school students, which is part of the Kiwanis International family of service-leadership programs (Prosperous High only)

Pig Mask Army: A student initiated gaming club at Rising High, in which people played computer games in the same room (though gamers did not have to play the same game). The club ceased to exist due to lack of attendance. An interviewee shared that initially 20 some people showed up, but many were not hard-core gamers (Rising High only)

RAKE (Random Acts of Kindness): A service club which aims to provide any kind of help or social support in school to create a positive environment of kindness (Prosperous High only)

School for Schools club: A service club which aims to raise awareness regarding the educational situation in Uganda via the Invisible Children Organization (Prosperous High only).

SIFF (Sharing Interests Forming Friendships): A club which matches high school students and special needs to students to provide support and health learning (Prosperous High only).

SPAM (Student Partners and Mentors): A club which aims at creating a place that supports the collective of individuals rather than cliques (Prosperous High only).

Superfans: a title given to a handful of students who pass down the role of leading audience chants and cheers, primarily during football and basketball games (Prosperous High only).

MUN (Model United Nations): An academic simulation of the United Nations that aims at “positively affect[ing] the lives of participants and prepare them to be better global citizens through quality educational experiences that emphasize collaboration and cooperative resolution of conflict” (National MUN). This is classified under Diversity Clubs though it is also about civics and Leadership. However, given the difference in nature (not school spirit oriented, unlike many other Leadership activities) and topic of focus, I felt it fit better in diversity. MUN is a nonprofit sponsored by the National Collegiate Conference Association (NCCA) (Rising High only).

3. *Categories of school clubs for both schools.*

I realize that some school clubs fit in more than one category. Many also help students develop civic and leadership skills. However, I categorized them based on their main activities, to the best of my knowledge.

I categorized the different school clubs used by respondents to describe the social types into: Sports, Sports fans, School spirit/civics, Art & music, Academic, STEM, Technology, Gaming, Language clubs, Journalism, Diversity Clubs, Service clubs, Professional development, Partying, Drugs & alcohol, Religion, and Other.

In “Sports,” I include team sports and dance (which refers to a dance team), but not dancing (which refers to the activity of dancing, which is grouped with partying). “Sports fans” refers to the act of attending sporting events like basketball and football games.

In “School spirit/civics,” I include activities such as being in the Leadership class, being an elected student government officer (e.g., President, Vice President, Treasurer, and other elected positions), being a class representative or Cabinet. I separated the Leadership class from other Service clubs given the different type of attention that the Leadership class receives, and its focus on school-centered activities—assemblies, elections, school acts, sporting events (therefore “school spirit”). However, readers should also know that in Service clubs, students also organize fundraising and other community service, though perhaps these service activities do not receive the level of school-wide attention that the School/spirit civics category. In the School spirit/civics category, I also include Cheerleading, Superfans, and the generic descriptor of “school spirit.”

I put Cheerleading in “School spirit/civics” rather than “sports” or “sports fans” because in addition to performing cheer stunts during games, the cheerleaders organize and volunteer in many community service activities to fundraise, and these typically receive school-wide attention. Further, the Cheerleading squad coordinates closely with Leadership and has a good representation in the Leadership class in both schools.

I also included Superfans in “School spirit/civics” because at Prosperous, the Superfans was a title passed down each academic year from an elitist few, who led sports fans during popular sports. The Superfans represented the school by wearing school colors and particular school gear. Superfans are leaders during popular sporting events at Prosperous and are widely known in school.

“Arts & music” includes Drama, Band, as well as artistic creations and informal student interest in music. I used the term STEM together with Academics when the academic activities were related to Science Technology Engineering and Math, such as Math, Physics, Robotics, Science Olympiad. I used Academic alone when the activities were not STEM related; e.g., if the activities included only Honors Society and homework, then I would label the category as “Academic” only.

I used “Gaming & Technology” rather than just “Gaming” because the Robotics Club was an activity that described the Brain social type at Prosperous along with other STEM types of social types which were involved clubs like Physics and Math. The Robotics Club was the only one of these clubs that also described the Gamer social type at Prosperous. However, at Rising, the Gamer social type was involved in non-digital games like chess. Thus, the term “Technology” was added to emphasize the technology aspect of some clubs.

“Language clubs” was not included in Academics because students at Rising described these clubs in terms of socializing—they did not need to speak the language.

I put within “Diversity clubs” those related to ethnicity, sexual orientation, and broader international issues (like MUN, or Model United Nations in Rising High).

Appendix 3. Converting a Two-mode Affiliation Matrix to a One-mode Proximity Matrix

In this appendix, I describe how I obtained the social type relations or structures illustrated in chapters 8, 9, and 10. In these chapters, I described respectively how social types are related to each other based on common school clubs (i.e., the clubs or activities in which respondents perceive two social types to be most active), common friendships (i.e., the common sets of friends that two social types share), and common technology interactions (i.e., for social types that share common friendships, the common frequency level of technology-mediated communication per each of seven technologies). These social type to social type relations or linkages are derived from *affiliation networks*, of how a social type is (perceived to be) related to school clubs, and of how student survey respondents are affiliated to their friends' social types. I expound below.

A-3.1. Basic concepts of two-mode networks

As discussed in Chapters 2 and 3, social entities (be it people, organizations, groups, or categories like social types) are located in Social Space, and their relationships in Social Space can be represented graphically in two-dimensional space. The representation of how such entities are related to each other, can be understood in terms of a *network* (i.e., a finite set of entities and the relation(s) between them (adapted⁷⁷ from Wasserman & Faust, 1994, p. 20). When all entities represented are of the same level of abstraction (e.g., only people, or only groups of the same type), then the representation is a *one-mode network* representation. When two types of entities are represented, then the representation is a *two-mode network*.

Typically, one-mode networks can also be represented in a square table or matrix. Its rows and columns are of the same length because the same entities are

⁷⁷ Adapted to reflect the possibility of network representations beyond the person-to-person relationships, and to include other entities, such as groups, categories, and organizations.

listed both in the rows and columns so as to indicate which entities are connected to which other ones. A value in a cell in such table indicates a type of connection between the entities. When the connection between entities is binary, such a matrix representation of connections is usually referred to as an *adjacency matrix*, indicating whether a relationship is present or not between adjacent entities. When the connection between entities is valued, and the value represents the strength of a connection, such that the higher the value, the stronger the connection, the matrix is usually referred to as a *proximity matrix*.

Two-mode networks can also be represented in a table or matrix, which is typically rectangular because chances are that the two types of entities have different numbers. For example, an *affiliation network* may describe how people are affiliated to groups, and there are likely more people than groups; thus the matrix of such affiliation network is rectangular. Further, the focus on two-mode networks is often on one of the modes only, based on the linkages that exist via the second mode (e.g., as mentioned in Chapter 3, two social types are linked by students who have friends in both social types). In other words, the linkages between entities in one mode are derived from the linkages these entities have with the other mode.

In the context of my dissertation, the relationship of social types based on common friendships and on common activities are derived from two-mode affiliation networks. In the common activities network, the affiliation network is about how social types are related to school clubs or activities based on students' perceptions of the school clubs/activities in which a social type is most active. In the common friendship network, the affiliation network is about how students are affiliated to their friends' social types. Finally, in a common technology interaction network, the affiliation network is based on the same student to friends' social type affiliation network, but the value per respondent for the student to social type link is the average frequency of interaction via a particular technology.

In Chapter 2, I provided a high level description of how I obtain social type overlaps based on common friendships. This is in essence converting an affiliation

network (of how a student is affiliated to its top friends' social types) into a proximity matrix of social types (of how they overlap based on the proportion of respondents who have friends in the same two social types; these respondents are the common friendships between the social types that overlap). The same method is used to convert an affiliation network of how social types (one mode) are active in school clubs (the second mode) into a proximity matrix of how two social types overlap based on the common set of school clubs in which both social types are perceived to be active. In my dissertation, I have respectively referred to these proximity matrices as common friendship network and common activities network. I describe these in more detail in the next sections, in the order in which they appear in the chapters: (1) common activities network, (2), common friendship network, and (3) common technology networks.

A-3.2. How I obtained the Common Activities Networks—of Social Types Channeled by School Clubs

To visualize the social types channeled by school clubs, I did the following.

(1) I first created a table or matrix of social types (S in rows _{s}) by school clubs (C in columns _{c}), call it the affiliation matrix A_{sc} . The value in each cell (x_s) represents the number of students who thought the social type was most active in that particular club (i.e., used the club to describe the social type). Along each row (or social type), a value exists for each school club used to describe the social type.

(2) To get at the social types that are channeled by school clubs, two rows are compared (e.g., Popular and Jock). (2a) For each school club (column) in which both social types have a value, it means that the same school club was used to describe both social types. Thus, their minimum common value is their commonality (e.g., if Popular is described by 5 respondents with Football, and Jock by 15 respondents with Football, then 5 is the minimum common value that Popular and Jock share for Football: the common number of respondents who perceived Football to describe both social types). (2b) Step 2a is done for the pair of social types across all columns of school clubs, and the number of clubs that the two social types have in common are added.

(3) This value is placed in a (new) square table of social type by social type (call it $S-S_c$), at the cell where Popular and Football intersect.

(4) Steps 2 to 3 are repeated for all pairs of social types. This whole procedure can be obtained by using the structure behind multiplying the matrix by its transpose: $A \cdot A'$, but instead of multiplying the values, taking the minimum value of the two cells that would be multiplied.

(5) I will refer to the outcome matrix as the $S-S_c$ converted matrix (social type by social type based on clubs) converted matrix. The outcome is a square matrix with rows and columns of equal length, representing social types. The off-diagonal values within this $S-S_c$ converted matrix represent the minimum common number of times that two social types were described by the same school club/or activity summed across all activities. The diagonal values represent total number of times that clubs or school clubs were used to describe a social type.

(6) Values in the off-diagonal cells of the $S-S_c$ matrix are normalized into proportions by dividing each value by the minimum common number of activities that describe the social type pair (Borgatti et al., 2002).

(7) The normalized matrix is visualized using a graph theoretic algorithm in Netdraw (Borgatti et al.; DeJordy et al., 2007). See Appendix 5 for a conceptual description of how Netdraw visualizes networks.

A-3.3. How I Obtained the Common Friendship Networks—of Social Types Channeled by Common Friendships

The approach is in essence the same as that used in A-3.2, with minor differences in how the converted square matrix is obtained. The affiliation network has respondents (student survey respondents) in the rows_R, and friends' social types in the columns_S; and to obtain the converted square matrix of social types linked by sets of respondents with friends on both social types ($S-S_R$), columns of social types are compared (whereas in A-3.2, rows were compared). The steps are:

(1) Create the affiliation matrix of respondents (r in row _{R}) by friends' social types (s in column _{S}). A respondent may have friends in three different social types, or all three friends in one social type, in which case the value in the cell X_{RS} would be 3. So, the value in each cell represents the number of friends that a respondent has in each social type, and can be interpreted in terms of that respondents' affiliation to those social types (see Chapter 3 and Chapter 9, section 9.2.1. for a justification of this).

(2) Compare two columns of social types (e.g., Gamer and Internet). (2a) If a respondent has friends in both social types (both columns), it means that the two social types are linked by that respondent, who is the common friendship for both social types. The minimum value between the two social types is the common sets of friends in the social types that are linked by the respondent. For example, if a respondent has 2 Gamer friends and an Internet friend, then 1 is the common value that both social types have that is linked by the respondent. Since the maximum value possible per respondent is 1 (as each respondent can nominate up to 3 friends only), then the common value between the two social types is also the link made possible by that respondent, who acts as the common friendship between the two social types. (2b) Step 2a is done for the same pair of social types across all respondents, and the minimum common values added.

(3) This total value is placed in a new square matrix of social types by social types linked by common friendships ($S-S_R$) at the cell where Gamer and Internet intersect.

(4) Steps 2 and 3 are repeated for all pairs of social types. This whole procedure can be obtained by using the structure behind multiplying the transpose of the affiliation matrix by the affiliation matrix: $A' * A$, but instead of multiplying the values, taking the minimum value of the two cells that would be multiplied.

(5) I will refer to the outcome matrix as the $S-S_R$ converted matrix (social type by social type based on the respondents with common sets of friends across the social types) converted matrix. The outcome is a square matrix with rows and columns of

equal length, representing social types. The off-diagonal values within this $S-S_R$ converted matrix represent the minimum common sets of friends in two social types that are linked by a set of respondents, who act as the common friendship linking both social types. The diagonal values represent that total number of friends that respondents nominated in a particular social type.

(6) Values in the off-diagonal cells of the $S-S_R$ matrix are normalized into proportions by dividing each value by the minimum common number of activities that describe the social type pair (Borgatti et al., 2002).

(7) The normalized matrix is visualized using a graph theoretic algorithm in Netdraw (Borgatti et al.; DeJordy et al., 2007). See Appendix 5 for a conceptual description of how Netdraw visualizes networks.

A-3.4. How I Obtained the Common Technology Interaction Networks—Mediated Channeling across Social Types

For the common technology interaction networks, the affiliation matrix per technology, or the *mediated affiliation matrix* is essentially the same as that in the common friendship network. The difference is that in the affiliation matrix per technology, the values in the matrix are the number of friends in a social type with whom a respondent interacts at or above a certain frequency level of interaction. One more step of data processing is needed before obtaining such affiliation matrix per technology, as I explain next.

In Chapters 5 and 10, I described that respondents identified up to three friends with whom they spent the most time, and reported the average frequency with which they interacted via each of seven technologies with each friend. The technologies were email (em), instant messaging (ins), texting (txt), cell phone (cell), social network sites (sns), twitter (tw), virtual worlds (vw). These frequency of interaction values were first dichotomized based on the mid-values of each frequency interaction interval, to artificially create criteria for when to count a technology interaction as an interaction. Chapter 10 (section 10-4) explains this in more detail. Thus, the steps to convert a one-

mode mediated affiliation matrix into a two-mode mediated proximity matrix (of social type by social type; i.e., a common technology interaction network) are:

(1) Prior to creating the affiliation network per technology, dichotomize respondents' interaction frequency with each friend for each technology. Frequencies at or above a threshold are set to 1, and frequencies below the threshold are set to zero. The thresholds are the mid-values⁷⁸ for the frequency intervals from which respondents could choose (see footnote 70 in Chapter 10). In this way, the mediated affiliation network per technology and the $S-S_R$ (social type by social type linked by respondent) per technology, or $S-S_T$ can be comparable to the un-mediated affiliation or the un-mediated proximity matrices.

(2) Use the same procedures in steps (1) to (5) in section A-3.3 above to produce the the $S-S_T$ proximity matrix.

(3) In step three in the point above, when comparing two social types per respondent, the minimum common value represents the number of friends with whom the respondent interacted at or above the interaction threshold. Added across respondents, the minimum common value between two social types is the common number of friends across two social types, with whom a set of respondents interacted at or above a frequency level. These sets of respondents are the common friendships for the people in the two social types who interacted above a frequency level with friends in two social types.

For each technology, multiple common technology interaction networks or mediated proximity matrices ($S-S_T$) are created, one per interaction threshold. For each of these interaction thresholds, the off-diagonals in the new $S-S_T$ (social type by social type mediated matrix) represent the number of common friendships across two social types that had mediated interactions with friends from these social types at or above a frequency level. The diagonals represent the total number of friends in a social type with which respondents interacted above that interaction threshold.

⁷⁸ Except for "Never" and "6 or more times a day," for which there are no mid-values, and just zero or 6 are used as the threshold.

Appendix 4. Average Frequency of Technology Mediated Interaction per Respondents' and Friends' Social Types

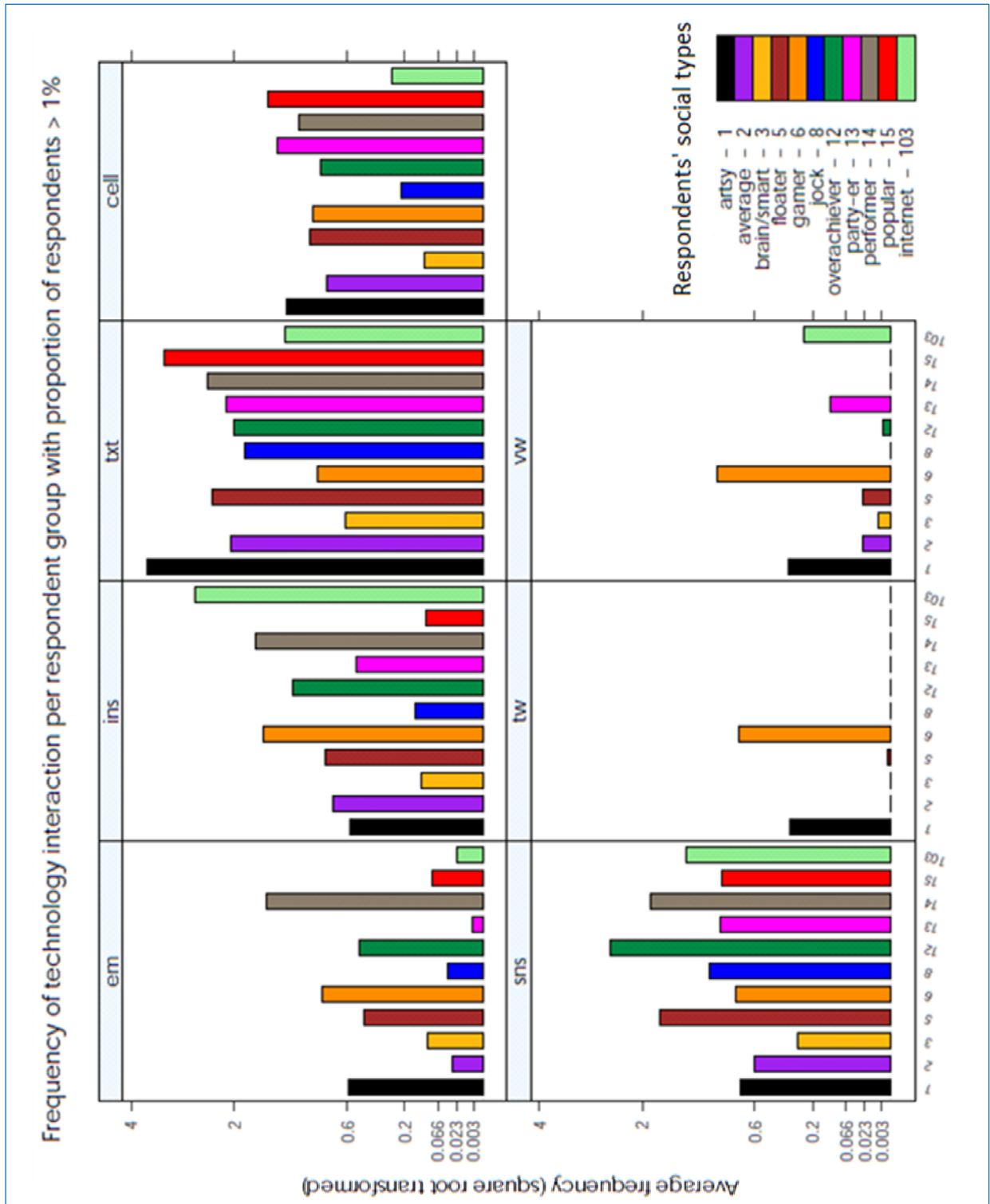


Figure A-4-1. Prosperous High: Frequency of Technology Interaction per Respondent's Social Type (for social types with greater than 1% of respondents).

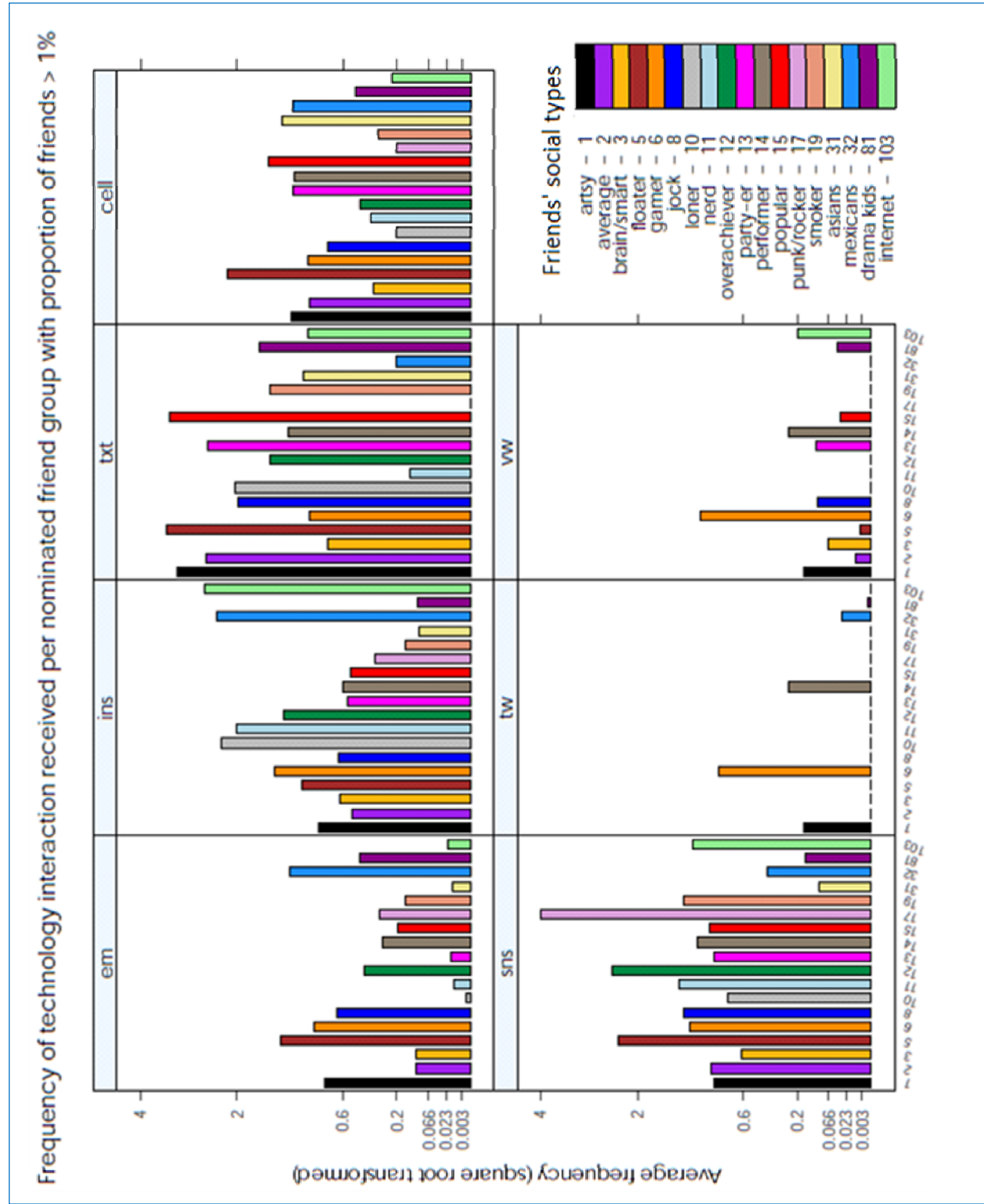


Figure A-4-2. Prosperous High: Frequency of Technology Interaction Received by Friends in Diverse Social Types (for social types with greater than 1% of respondents).

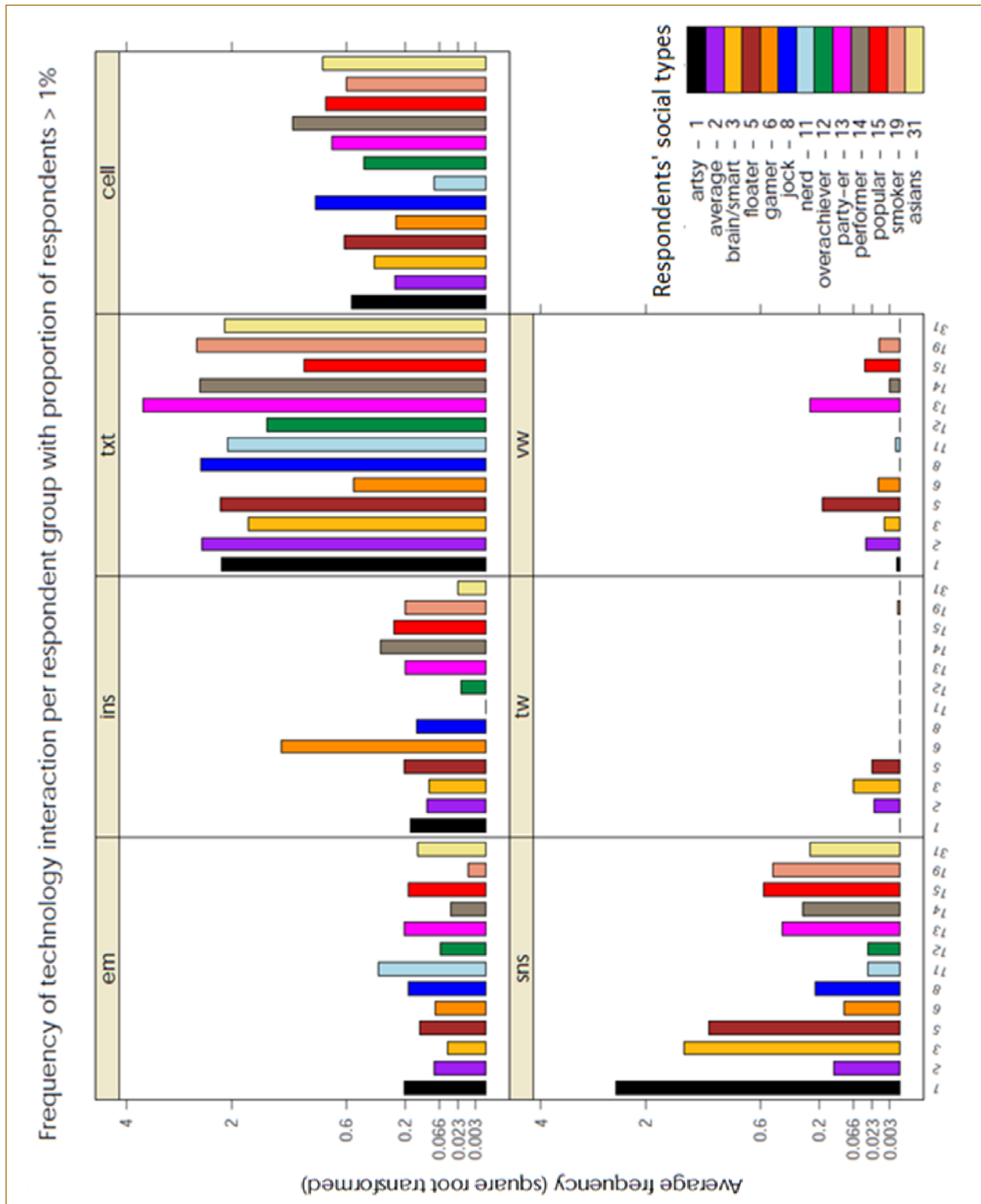


Figure A-4-3. Rising High: Frequency of Technology Interaction per Respondent's Social Type (for social types with greater than 1% of respondents).

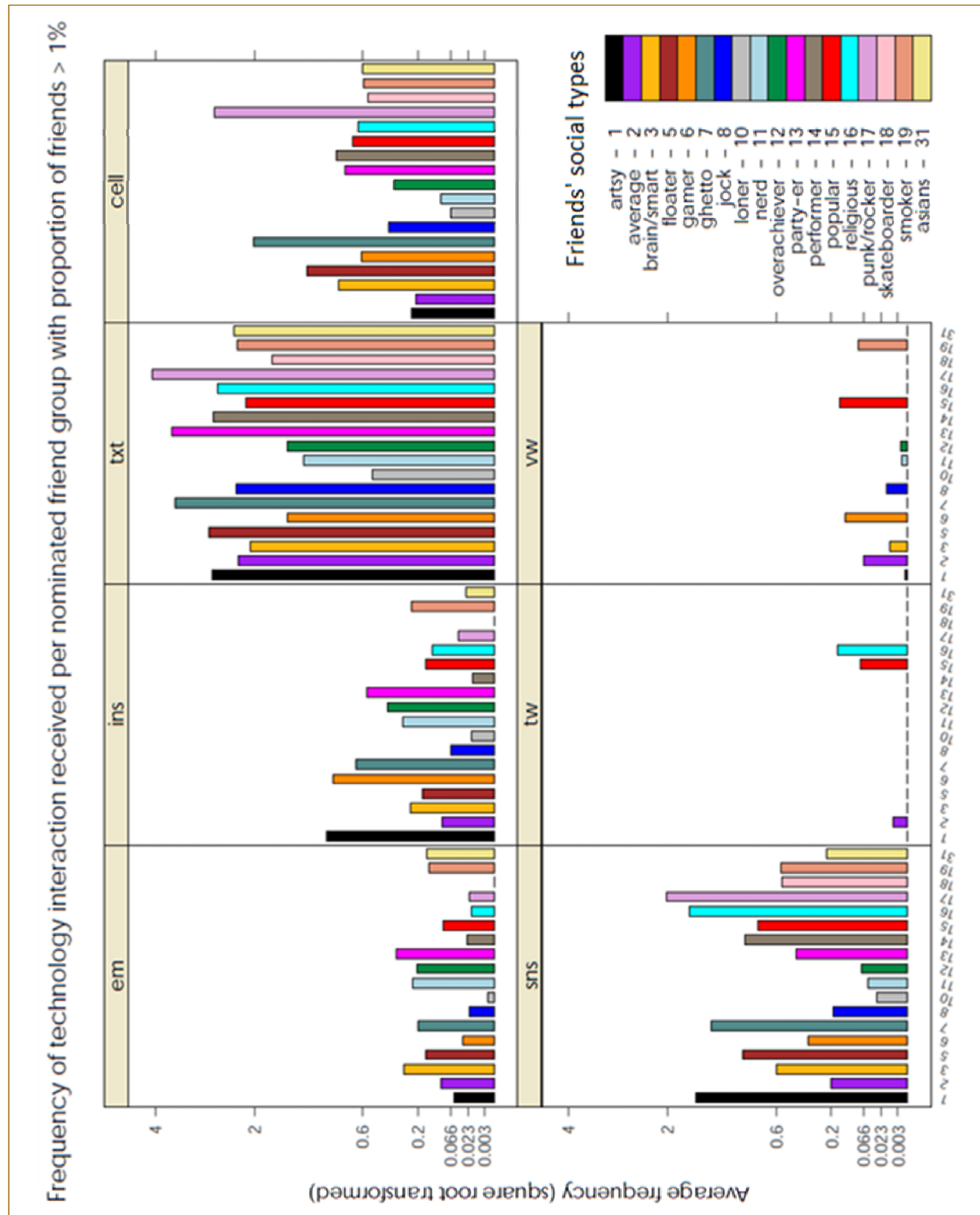


Figure A-4-4. Rising High: Frequency of Technology Interaction Received by Friends in Diverse Social Types (for social types with greater than 1% of respondents).

Appendix 5. UCINET Netdraw's Visualization of Network Graphs

Netdraw is a visualization tool embedded in UCINET, a software package for analyzing and visualizing social network data. UCINET is developed by Borgatti, Everett, and Freeman (2002). In this appendix, I provide very basic conceptual descriptions of how Netdraw visualizes network graphs, which assumes some familiarity with multi-dimensional scaling. For more details, please consult Borgatti et al (2002)'s technical documentation, DeJordy et al. (2007), and Hanneman & Riddle (2005).

Netdraw implements various kinds of network visualizations, and its main contribution is in having a visualization method that integrates a spring embedding approach (that of Kamada & Kawai, 1991) and a MDS approach (see DeJordy et al., 2007), such that nodes are positioned in a two-dimensional space by applying MDS to geodesic distances (i.e., applying MDS to shortest paths between nodes), and making the length of the paths of similar length while avoiding as much as possible, the overlap of lines or nodes in a network. In order to describe in a bit more detail how this works, I briefly describe Multidimensional Scaling (MDS) and spring embedding at highly abstract levels.

A-5.1. Multidimensional Scaling

Multidimensional Scaling, widely referred to as MDS, is one of most widely known methods for visualizing one-mode proximity network data. At a non-technical level, the purpose of MDS is to visually represent the pattern of proximities (i.e., similarities or distances) amongst a set of entities which are related to each other based on these proximity values (Borgatti, 1997).⁷⁹ For example, suppose we have a proximity matrix of social types, in which the proximity values are how similar two social types are based on the number of school clubs they have in common. MDS would plot these social types on a two-dimensional space—a visual map, such that the social types that are more similar (or have a higher proportion of clubs in common) are placed near each

⁷⁹ The classic pieces on MDS are by Togerson (from 1965) and Kruskal (from 1965) (see Steyvers, 2002), but I reference secondary sources for their level of abstraction fit this appendix's non-technical purpose better.

other on the visual map; and social types which are very different from each other, or have no common school clubs are placed far away from each other on the map.

An example that may be easier to understand is one based on actual physical distances between US. cities. This example is the same one that Borgatti (1997) uses to illustrate MDS, and the “cities” data is freely available with the UCINET download. Running MDS⁸⁰ in Netdraw on the data in Table A-5.1-1 produces Figure A-5.1-1.

Table A-5.1-1. Physical distances⁸¹ between select U.S. cities (in miles)

	BOSTON	NY	DC	MIAMI	CHICAGO	SEATTLE	SF	LA	DENVER
BOSTON	0	206	429	1504	963	2976	3095	2979	1949
NY	206	0	233	1308	802	2815	2934	2786	1771
DC	429	233	0	1075	671	2684	2799	2631	1616
MIAMI	1504	1308	1075	0	1329	3273	3053	2687	2037
CHICAGO	963	802	671	1329	0	2013	2142	2054	996
SEATTLE	2976	2815	2684	3273	2013	0	808	1131	1307
SF	3095	2934	2799	3053	2142	808	0	379	1235
LA	2979	2786	2631	2687	2054	1131	379	0	1059
DENVER	1949	1771	1616	2037	996	1307	1235	1059	0

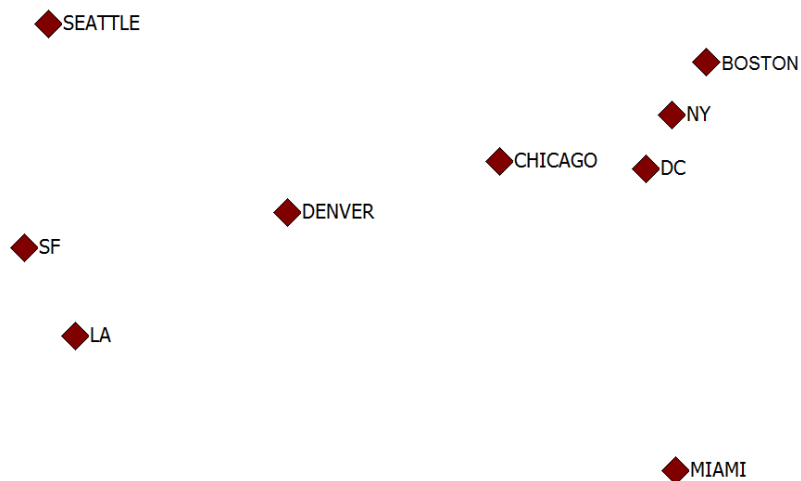


Figure A-5.1-1. Multidimensional scaling representation of distances between US cities

⁸⁰ There are various flavors of MDS (Mead, 1992), and metric MDS was used. Metric MDS is used when the values represent metric scales.

⁸¹ These are not driving distances, but direct distances on a map.

In Table A-5.1-1, the cell values indicate physical distances (in miles) between two US cities, and their relationship is distances (rather than similarities). That is, the smaller the value, the closer the cities.

I copy Borgatti (1997)'s high level description of the MDS algorithm, and add minor clarifications. Below is what happens at a high level when running MDS:

- (1) The input matrix with distance values is the D-matrix. The nodes or entities in this matrix are assigned arbitrarily to a multi-dimensional space.
- (2) Euclidean distances between these nodes are calculated to form a distance matrix, call it D-hat.
- (3) Compare the input D-matrix with the D-hat matrix by evaluating a stress function, which assesses the degree of correspondence between the distances in the D-matrix with those in the D-hat matrix. The smaller the stress value, the greater the correspondence, and the better the representation.
- (4) Adjust coordinates of each node or entity in the D-matrix to minimize stress.
- (5) Repeat steps 2 through 4 until the minimum stress is reached.

Thus, at a more technical level, the goal of (metric) MDS, given a set of nodes that are interrelated to each other, is to find a configuration in multidimensional space for these nodes, such that the distances between nodes are related to an experimental set of distances by some transformation function (Steyvers, 2002).

The problem with MDS is that sometimes data is multi-dimensional (i.e., all social science data), and thus representation in two-dimensions using MDS always involves some stress (lack of correspondence between the input matrix of distance values and the experimental distances in the D-hat matrix). Stress can be reduced by increasing the number of dimensions (although the visual representation may still be limited). However, in most data sets, we cannot know in advance how many dimensions are needed, and the number of dimensions needed may complicate the interpretation

to a level that is not human-comprehensible. Advancements have been made to MDS, and rather than discuss these in this appendix, I proceed to describe spring embedding as my purpose is to describe the graphic layout procedure employed by Netdraw.

A-5.2. Spring Embedding in Netdraw

I produced the visualizations of common activities networks, common friendship networks, and common technology networks using Netdraw's spring embedding method. Netdraw adapts Kamada and Kawai's 1991 spring embedding algorithm to visualize proximity data (DeJordy et al., p. 247). In a review on force-directed drawing algorithms, also known as "spring embedders," Kobourov (2013) classifies Kamada and Kawai's approach as a "graph theoretic approach." According to Kobourov, Kamada and Kawai's algorithm "uses spring forces proportional to the graph theoretic distances" (p. 383), which are based on geodesic distances (or length of shortest path between nodes). Geodesic distances are known in the popular press as "degrees of separation" (DeJordy et al., p. 247). In other words, the optimal drawing of a graph is done by matching the geometric distances between pairs of nodes in the graph to the geodesic distances (shortest paths) between pairs of nodes, as computed by the "All-Pairs-Shortest-Path" computation in Kamada and Kawai's algorithm (Kobourov, p. 388). As this matching is akin steps 3 and 4 in MDS, DeJordy et al. describe Kamada-Kawai's algorithm as "an MDS of the associated geodesic distance matrix" (pp. 247-8). As such matching is not always possible, the approach uses a spring system, such that: "if a pair of vertices [i.e., nodes] is (geometrically) closer/farther than their corresponding graph distance the vertices repel/attract each other.

Kamada and Kawai's spring embedding algorithm is slightly different from other force-based algorithms. In force-based algorithms, typically, "there are repulsive forces between all nodes, but also attractive forces between nodes which are adjacent" (p. 383), much like the forces in a spring system. In the Kamada and Kawai algorithm, rather than having separate attractive and repulsive forces, the vertices or nodes in a

graph repel or attract each other based on how closer or far they are from their corresponding graph distance (Kobourov, p. 388).

One additional point to make about this visualization method is that, as many others, it attempts to minimize the amount of lines crossing with each other. Further, since the graph is produced based on geodesic distances (i.e., shortest paths between nodes), it is appropriate for the types of interpretations I use on the common activities and common friendship networks. The links between nodes are about how social types overlap with each other, and how some social types channel social information across other social types—this is about reach to social support, values, and norms, which are appropriately represented in terms of shortest paths. Unlike gossip or other information which can be diffused via acquaintances, social support and access to social validation for teens occurs via the people from whom they feel a sense of relatedness (Ryan & Deci, 2000)—their close friends.

Appendix 6. QAP Correlation

The Quadratic Assignment Procedure (QAP) is a nonparametric approach to calculating statistical significance on social network data (Whitbred, 2011). The procedure addresses the assumptions of independence underlying other parametric statistical techniques that do not apply to social network data. To clarify, an example where observations are independent is attribute data such as age. A respondent's age is not going to be affected by another respondent's age. An example of observations that are dependent is collecting data from the same respondent more than once without knowing so; or determining technology mediated communication preferences by asking a group of friends, who are likely to communicate with each other via the same sets of technologies. The problem with using methods that assume independence, on observations which are not independent is that the errors may also be correlated with each other; thus inflating or deflating standard errors (which are needed in the process of assessing statistical significance). Thus, alternative methods are needed to calculate statistical significance on observations which are interdependent, like that in social network data.

In social network data, relations are interdependent (i.e. not independent). For example, if the social type Jock overlaps with the social type Popular, and the social type Popular overlaps with the social type Partyer, then it may be likely that Jock also overlaps with Partyer. Thus, the observations of the relations (observation 1: Jock-Popular; observation 2: Jock-Partyer; observation 3: Popular-Partyer) are not independent, and the methods used to assess significance in a parametric correlation cannot be used in such data.

In QAP correlation, when correlating two social networks, there is still an interest in finding the probability with which the correlation obtained is greater than that which can be obtained by chance. However, rather than comparing the obtained correlation with a theoretical distribution, the obtained correlation is compared against an empirical sampling distribution, where standard errors are estimated using permutations of the proximity data (Simpson, 2002).

This empirical sampling distribution is built by keeping the sets of pairs (i.e., Jock-Popular, Jock-Partyer, Popular-Partyer, etc.) intact (Simpson), but permuting (i.e., randomly reassigning) their values (their overlap) to different pairs of social types (e.g., the value that existed for Jock-Popular is now assigned to Popular-Partyer, etc.). The permuted values create a new proximity matrix (a new common technology interaction matrix). A new correlation is run for this new proximity matrix and the original common friendship matrix, and the new correlation value saved. Only the proximity matrices of the common technology interaction networks are permuted (not the values in the common friendship network) as the common technology interaction networks are being correlated to the common friendship network. Creating new proximity matrices created by permuting the values in the common technology networks, correlating the new common technology matrix to the common friendship matrix, and saving the correlation is done 5,000⁸² times (or less or more). In this way, an empirical sampling distribution is obtained.

Finally, the test statistic (the original observation) is compared to this empirical sampling distribution. If the probability with which the test statistic occurs in the empirical sampling distribution is less than 5%, the observed correlation is significant (this, when using a p-value of 0.05).

QAP correlation can also be thought of in terms of the correlation of two variables (or columns) (Kim, Kim, Park, & Rice, 2007). The non-diagonal values of the proximity matrices are each first converted into single columns of values for each pair of social type (e.g., Jock-Popular: 15 would be a value for a pair of social types). The same is done for the common friendship network. The two columns (one for pairs of social types in the common friendship network and one for pairs of social types in the common technology interaction network, matched by the same pairs) are correlated. For the permuted versions, for one column (the common technology interaction), the values for each pair of social types (rows) are randomly reassigned to a different pair of

⁸² This is the number of permutations I used in my data, but this number can be set differently.

social types in that column, and the column is correlated again to the common friendship network column.

A few notes to be made before concluding this appendix. First, the input for QAP correlations must be square matrices. Second, for my data, I used the *qaptest* function in R's⁸³ *sna* package to compute the QAP correlations illustrated in Figure 10-2.

⁸³ From the r-project site: "R is a language and environment for statistical computing and graphics. It is a GNU project which is similar to the S language and environment" (R Project, n.d.)