

PERSONAL ATTITUDES, PERCEIVED BELIEFS AND SOCIAL STRUCTURES

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Abstract

Using network statistical models, we examine personal attitudes and perceived beliefs within human social networks. Network ties form not just on the basis of individual attitudes but also through perceived beliefs, individual perceptions of generally held attitudes. Empirically, we examine how attitudes and perceived beliefs about masculinity shape social systems within a school and a sporting team. An interaction of attitudes and perceived beliefs helps explain hierarchies in the school. Perceived beliefs but not attitudes are associated with bullying relations in the sporting team. We conclude that perceived beliefs influence tie formation differently depending on local cultural contexts.

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1. Introduction

The structure, agency and culture triad is a theoretical problem of great interest to social scientists (Abbott, 1997; Emirbayer & Goodwin, 1994). The assertion that “structure, culture and human agency presuppose one another” (Emirbayer & Goodwin, 1994, p. 1413) has profound implications for the study of human social relations because it asserts the interdependency of structural, individual and cultural factors in social interactions. Processes such as social influence and social selection indicate that individual-level factors interact with social relations. Individual characteristics such as gender (McPherson, Smith-Lovin, & Cook, 2001; Munch, McPherson, & Smith-Lovin, 1997), psychological predispositions (Kalish & Robins, 2006) and even delinquency behaviors (Snijders & Baerveldt, 2003) have been shown to have effect on or be affected by social network ties. Further, the interdependency between social relationships and identity has been argued by White (1992) and social identity theorists (Tajfel & Turner, 1979; Turner, 1999; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987).

In social network research much less work has focused upon the interdependency of cultural factors with structural and individual factors. Emirbayer and Goodwin (1994) indicated that culture defines what is permissible and what is not, thereby enabling and constraining action. There are many definitions and conceptualizations of culture, for it is a highly contested concept, and we do not wish to enter into those debates. But one component of culture that seems central to the concept is that it is shared across individuals and that the individuals concerned have some (perhaps not complete) understanding of that sharedness. Rather than the concept of culture *per se*, in this article we are interested in the shared understandings that can underpin a culture. More specifically, we shall focus on shared beliefs.

Because it is shared across individuals, culture is routinely thought of with regard to groups, organizations, or at national or regional level. In terms of measurement and observation, however, culture can be examined at an individual level. Chao (2000) asserted a multilevel notion of culture that incorporated individual level perceptions. DiMaggio (1997) argued that along with its external manifestations, culture also operated within individual cognitions. DiMaggio suggested that each person has an understanding of what constitutes culture, and this has a strong cognitive component that may affect lives through the sorts of relations established with others. Of course, people have different perceptions of the cultures they inhabit; using Cultural Consensus Theory, Romney, Weller and Batchelder (1986) attempted to extract shared cultural interpretation relying solely on individual-level information (see also Batchelder & Romney, 1988).

The proposition of individual-level observation becomes more obvious when we step back from the general notion of culture to the more specific concept of shared beliefs. Beliefs and attitudes are the outcomes of individual cognition; shared beliefs are those beliefs commonly held across a set of individuals. We could survey attitudes across individuals and then use Cultural Consensus Theory, or other similar methodological approaches, to extract a set of shared beliefs. But such are not necessarily what each individual perceives. Individuals have personal attitudes as well as perceptions about other people's attitudes. Those perceptions may be wrong and yet people may act on them.

Accordingly, we hypothesize that it is not just the individual's personal attitudes that affect the social ties they seek to form but also the individual's *perceptions* of the attitudes of others. More specifically, following Emirbayer and Goodwin (2004), we state the general hypothesis that there may be interdependencies among social ties, individual attitudes and individual perceptions of common beliefs. We call these

perceptions of common beliefs *perceived beliefs*. Perceived beliefs are people's understandings of the general attitudes held by other people in their social world, providing important cues and information about how that world operates, and of one's place within it. An individual's perceptions are distinct from personal attitudes, and reflect understandings that incorporate cultural rules and social norms. In this article, we examine this notion empirically using statistical models for social networks.

In section [2] of this article we outline the conceptual difference between personal attitudes and perceived beliefs, and review research demonstrating the importance of perceptions of social situations to individual behavior. In [3], we introduce statistical models for social networks and articulate how we can examine the effects of personal and perceived beliefs. In section [4], a framework to measure the perceived beliefs of others and incorporate them into statistical models is proposed, together with an explanation of the methodological approach. In [5], two empirical examples are presented. Finally in [6], we discuss implications and in [7] make our conclusions.

2. Perceptions of others and social behavior

In social interactions, part of the motivating force for action by the individual, in addition to personal attitudes and motivations, relates to the cues they take from others around them. There is a fundamental difference between personally endorsed beliefs and what an individual perceives are the beliefs, intentions and motivations of others. The concept of "public opinion" is a popular and simple illustration. A journalist who contributes a piece on public opinion does not usually engage in extensive surveys of whole populations to obtain detailed empirical data. Rather, the journalist has a perception of what others believe, derived from experiences of interacting with others. Public opinion in this sense is related to the journalist's perception of the beliefs of

others, not necessarily to the actual attitudes of others. Frequently, of course, the journalist's own beliefs may be implicated in what he or she perceives to be public opinion. Therefore, perceived and actual opinions are not unrelated – there is dependency even though they are conceptually distinct. This is a fundamental point. There is a difference between *actual* shared attitudes across a group of people, and the *perceptions* by an individual of the attitudes commonly held by people in the group.

The importance of the perceptions of the attitudes of others on the behavior of the individual is well supported in psychological literature. The notion of *groupthink* (Janis, 1971) refers to conforming to or conferring with group beliefs. This group consensus may override realistic situation appraisals and/or the individuality of group members, resulting in suboptimal decisions and outcomes for the group. Similarly, *pluralistic ignorance* (Katz & Allport, 1931) refers to the phenomenon where most of a group's members do not endorse a certain norm but incorrectly assume that it is accepted by most others. “The illusion of support is validated when it motivates widespread public compliance” (Centola, Willer, & Macy, 2005, p. 1010). So perceptions of the attitudes of others have regulatory effects on people's behaviors, in part because people fear social sanctions (Centola et al., 2005). *Social comparison theory* (Festinger, 1954) suggests that in ambiguous situations or where objective criteria is lacking, people assess the veracity of their own views through comparison with the attitudes of others around them. Social comparison theory highlights the strong relationship between personal views and the perceived beliefs of others, and how these perceptions may guide personal attitudes, and therefore behavior. In discussing the work of Sherif, Friedkin (2001, p. 170) noted that norms can arise when interpersonal interactions resolve uncertainty and conflict.

Social identity theory (SIT: Tajfel & Turner, 1979) and the theoretically related *self categorization theory* (SCT: Turner, 1999; Turner et al., 1987) are social

psychological theories of group processes, intergroup relations and norms. These theories assert that “self-enhancement is best achieved through strategies that achieve a sense of in-group superiority relative to an out-group” (Hornsey & Hogg, 2002, p. 203). The basic argument behind the theory is that people cognitively represent social groups in terms of prototypes, a subjective representation of the beliefs, attitudes, and behaviors definitive of a social category (Hogg, Terry, & White, 1995). Prototypes emphasise the similarities within, and differences between, categories. Those within the group who best exemplify the prototype are the most admired. It is important to note that the prototype is not the ‘average’ in the group but is ‘more extreme’, a standard or norm to which group members may aspire. Lindenberg (1997, p. 304) argued that “powerful people have a common interest in creating categories and stereotypes which are favourable to their power position and their social identity”, in which they can best exemplify prototypes. These theories are well-elaborated arguments about how perceptions of others in comparison to personal qualities may influence social hierarchies.

The flow of cultural information is also affected by perceptions of others. Lyons and Kashima (2003) showed how the transmission of stereotypes was dependent upon the perceived characteristics of others in the community and of those to whom the information was imparted. They provided an empirical demonstration of how the actual behavior of an individual towards social partners could be altered by perceptions of group ideals and standards.

In all of the examples above, individual behavior is affected, one may say constrained and enabled, by the individual’s perception of the beliefs of others around them. These perceived beliefs tap what an individual believes others think, not what the individual necessarily believes. This conceptual distinction is the main thrust of this article. We aim to measure both personal attitudes and perceived beliefs simultaneously,

to explore how, singly or in combination, they may have implications for social structures.

3. Exponential random graph (p^*) models

Recent developments in statistical models for social networks give us new ways of examining possible interdependencies among social ties, personal attitudes and perceived beliefs. Originally developed by Frank and Strauss (1986), Wasserman and Pattison (1996), Pattison and Wasserman (1999) and Robins, Pattison and Wasserman (1999), exponential random graph (p^*) models are a family of statistical models for social networks that can be applied to complex social structures. A number of texts have helpful introductions to exponential random graph (p^*) models (Contractor, Wasserman, & Faust, 2006; Robins, Pattison, Kalish, & Lusher, 2007). Individual level variables and structural relations may be examined simultaneously (Robins, Elliott, & Pattison, 2001; Robins, Pattison, & Elliott, 2001). New specifications permit examination of higher order social structures (Snijders, Pattison, Robins, & Handcock, 2006), and help avoid previous problems of degenerate models that could not represent the data well. Specifically, the introduction of higher order parameters allows for the examination of networks that are highly clustered (i.e., with denser regions of the network involving much triangulation) with a relatively small number of parameters. The result not only is a better account of highly transitive networks, but also frees up parameters for the examination of node-level attributes. Recent descriptions of these important new developments are presented by Goodreau (2007), Hunter (2007) and Robins, Wang, Snijders, Handcock and Pattison (2007).

A particular advantage of the p^* model approach is the notion of conditional dependence (or interdependence) which underpins it. Rather than treating individuals as independent actors within a local context, conditional dependence specifically

articulates the interdependencies between individuals. This assumption ties the methodological approach with the theoretical assertions of interdependency by, for instance, Emirbayer and Goodwin (1994).

We introduce the following notation. X_{ij} is a random variable referring to a particular social network relation, with actors i and j theoretically representing all pairs of actors in a network. When a tie is present between i and j then $X_{ij}=1$, and $X_{ij}=0$ otherwise. x_{ij} is specified as the observed value of the variable X_{ij} , and \mathbf{X} is a matrix of all variables, with \mathbf{x} the matrix of observed ties, thus the observed network. For example, in any particular social network (e.g. a school classroom of 25 children) there are a (finite) number of possible relations between individuals for an observed (measured) relation. All possible combinations of a relation (e.g. 'is a friend of') are represented by \mathbf{X} . An observation (or instantiation) of that network (such as that collected by a researcher) is \mathbf{x} and may contain a few ties or many ties between actors.

Each model is asserted as a combination of parameters to describe effects that we may expect to see in the network. For instance, in a friendship network it is likely that we may see considerable reciprocity and transitivity. By including parameters for these local social structures of reciprocity and transitivity it is possible to infer if such local structures occur at greater (or less) than chance levels. For instance, by including a reciprocity parameter in a p^* model it is possible to determine statistically if there are more or fewer reciprocal friendship ties than expected in the observed network, given the size of the network and the other effects in the model. Similarly, a transitivity parameter permits the researcher to measure the degree of transitivity in the network and investigate whether there is more or less clustering than expected by chance. Models which include node-level attributes enable the examination of whether individual attributes affect the sending and receiving of ties. These sender and receiver effects are included as parameters in the model, permitting one to ascertain if social ties

are more likely to occur from or to individuals within the network as a result of their personal-level attributes. Models also permit the investigation of homophily effects.

A basic set of structural effects and parameters included in the models described in this article are summarised and explained in Table 1. These are the parameters introduced by Snijders et al (2006). All structural parameters included in the table utilize directed ties such that the arrow indicates the selection of one actor by another. In Table 1, the simplest structural components, or configurations, are density (1) and reciprocated ties (2). Parameters for the distribution of popularity of actors (3) and of expansiveness, or activity, of actors (4) involve slightly more complex structures because they include more than two nodes, and reflect developments by Snijders *et al* (2006). A clustering parameter (5) represents tendencies for triadic closure (e.g. a friend of a friend is a friend). The multiple connectivity parameter (6) represents tendencies for multiple paths between pairs of nodes (but ones that do not necessarily form triads). The interaction of individual-level attributes and social ties can be represented by a number of parameters, indicating whether individuals with certain characteristics are more likely to *send* social ties (7), *receive* social ties (8), choose homophilous others with respect to binary categories (9), or choose homophilous others regarding levels of a continuous attribute (10). Of note is that homophily for binary variables as measured by parameter (9) is indicated by a significant and positive parameter estimate whereas for homophily for continuous variables that parameter (10) examines is represented by a significant and negative parameter estimate (i.e. indicating *less of a difference* of the continuous attribute between sender and receiver).

In this article, personal attitudes and perceived beliefs are measured at the level of the individual and so represent individual-level attributes. Personal attitudes and perceived beliefs then may be examined using these sender, receiver and homophily effects. Nevertheless it is important to include the other structural effects (1-6) in the

models, in order to control for endogenous structuring within the network. In effect, such a control caters for interdependency among the observations and enables a valid inference about attribute-based effects.

Parameters can be estimated using Markov Chain Monte Carlo Maximum Likelihood Estimation (MCMCMLE) techniques that are more reliable than the older pseudo-likelihood approaches (Hunter & Handcock, 2006; Snijders et al., 2006). A large positive parameter estimate is evidence that the effect is present in the network more than would be expected by chance.

[insert Table 1 about here]

The exact nature of interdependency between structural, individual and cultural factors is likely to vary with the content of investigation – that is, on the specific social relations, beliefs and personal qualities of the individuals in the network being investigated. We examine interdependencies in an exploratory manner in two local contexts.

4. Data and measures

The data involves two networks, collected by Lusher (2006): a network of 72 year 10 secondary school boys from a private, religious all-male secondary college, and a network of 38 professional footballers from an all-male sporting club (the Australian Football League, or AFL). The AFL is a national-level professional sporting body that receives wide interest and support in Australia. These two all-male contexts were specifically chosen to explore how notions of masculinity are related to social hierarchy and norms of gendered behaviour. The schoolboys had a mean age of 15.5 (standard deviation of 0.5) and the footballers had a mean age of 22.7 (standard deviation of 4.0).

Relevant ethics committee approvals were obtained for both participant contexts.

4.1 Social network questions

We examine the schoolboys' networks involving relations of positive affect. We derived a binary positive affect network from three name generator questions whereby respondents were asked to nominate individuals who [1] were friends, [2] you admire, and/or [3] you would like to be seen with. Nominating any student on any of these relations led to the presence of a tie in the network, denoted as $X_{ij}=1$, otherwise $X_{ij}=0$. A binary, composite negative tie network was constructed from these three questions. That is, the presence of a tie in any or all three of these networks between actors i and j led to the inclusion of a tie between actors i and j in the positive affect network, otherwise no tie was considered to be present.

For the football club, we examine bullying relations. No mention of the term "bullying" was made in the surveys. Instead participants were asked about their involvement in specific, habitual behaviors comprising physical (e.g. unnecessarily aggressive towards you during training activities), verbal (e.g. tease, puts you down) or social (e.g. exclude, not socialise with) bullying. Further, ties are represented as self-nominations of victimization. That is, participants nominated others that bullied them, but participants did not nominate others they themselves bullied. Again, a binary and composite bullying network was produced, in the same manner as for the positive affect network for schoolboys, from the name generator questions regarding these bullying behaviours among footballers.

4.2 Individual-level measures

Attitudes towards masculinity were the focus of the research as both have been theorized as contributing to social hierarchy formation among males (Connell, 1995;

Connell & Messerschmidt, 2005). Personally held and perceived notions of masculinity were measured through the Masculine Attitudes Index (Lusher, Robins, & Dudgeon, 2007). This inventory has both adolescent and adult versions, with major subscales including anti-femininity, gay-male homophobia, and violence. For adolescents, an anti-academic subscale is also included, and for adults, a subscale measuring masculinity as sexual success (or *playboy attitudes*) Scale scores are averaged across all items of the four subscales, with a minimum of 1 and maximum of 7. Higher scores more strongly endorse anti-feminine, homophobic, and violent attitudes (as well as anti-academic and playboy attitudes) which we refer to as indicative of a more dominative masculinity. The MAI has been validated using confirmatory factor analysis. Measures of fit for expected factor structures were excellent.

To obtain a measure of personal and also perceived beliefs, participants were required to answer the MAI items twice, firstly with respect to their personal attitudes, and secondly with regard to their perceptions of the beliefs of others around them. For school students, the reference group was those students they considered as their close friends. For the AFL Club, the reference group was the club itself, thus the general attitudes held by most people at the club. We refer to an individual's endorsement as *personal MAI* and to the individual's perceived opinions of their group of friends as *perceived MAI*. For the schoolboys, personal MAI had a mean of 3.77 (standard deviation = 0.92) and a perceived MAI of 4.15 (standard deviation = 0.89); for the footballers, personal MAI had a mean of 2.88 (standard deviation = 0.63), and a perceived MAI of 3.15 (standard deviation = 0.69).

4.3 Control variables

Other individual-level measures were utilized in this research as control variables which are also presented in our results but are not the prime consideration of

the research. For schools, control measures were ethno-cultural background and socioeconomic status. Ethno-cultural background was a binary variable. Students were classified into dominant or non-dominant ethno-cultural status. Dominant culture students were defined as those who identified as Australian, Anglo-Australian or of British or Irish heritage, and spoke only English at home. All other students were considered to be of non-dominant cultural status. Socio-economic status (SES) was calculated using the Socio-Economic Index For Areas (SEIFA 2001), Index of Relative Socio-Economic Advantage/Disadvantage (ABS, 2001), which is derived from home postcodes, with higher scores indicative of greater socio-economic advantage.

For the footballers, control variables were playing ability, experience, and relationship status. A measure of AFL playing ability was included as a continuous variable for each player. Indegree centrality scores were calculated from another network which asked players to nominate the best players at the club. Experience was measured by the number of AFL games played. A binary variable indicating whether or not players were in an ongoing romantic relationship was also included.

5. Results

As expected, there were associations between personal MAI and perceived MAI ($r = .80, p < .001$, for schoolboys; $r = .54, p < .001$ for the footballers). Nevertheless, paired sample t-tests showed that the perceived MAI was significantly higher than personal MAI (for the schoolboys, $t(71) = 5.70, p < .001$; for the footballers, $t(37) = 2.58, p < .05$). So the students and the footballers tended to believe that masculine attitudes were more dominative than they really were, though this difference was more pronounced for the students. We now present two instances of the impact of perceived beliefs on social network structure: one within the context of the school, and one within the context of the AFL Club.

5.1 Example 1: The interdependency of structural, individual and cultural factors

Results from four different p^* models for the positive affect network among the schoolboys are presented in Table 2. The models differ in the following ways. Model A examines only structural factors, including higher order structural parameters from Snijders *et al*, 2006. Model B examines simple structural factors (density, mutual ties – i.e. dyadic independence structural factors) and individual attributes (but not perceived MAI). Model C is the same as Model B, but with the addition of higher order structural parameters. Finally, Model D includes higher order structural variables and individual-level variables, including perceived MAI. This is our main Model of interest because it simultaneously examines the interdependent effects of personal attitudes, perceived beliefs and social structures. By presenting a range of models with different model parameters for the same social network it is possible to see how the introduction of differing parameters interact and explain social tie formation¹.

[insert Table 2 about here]

5.1.1 Notes on Table 2

The cells contain parameter estimates with standard deviations in brackets. A parameter is assumed significant when the parameter estimate is greater than 1.96 times the standard deviation, and is denoted by “*”. A significant and positive parameter indicates that the configuration occurs at greater than chance levels, given the other effects in the model. A significant and negative parameter indicates that the configuration occurs at less than chance levels, given the other effects in the model. Because the estimates produced are from Markov Chain Monte Carlo Maximum

Likelihood Estimation (MCMCMLE), standard errors are reliable. Blank cells indicate that the parameter was not used in the model.

5.1.2 Structural effects

In Models A, C and D, both clustering and reciprocity are significant and positive parameters, indicating that these effects occur at greater than chance levels in the model. Combined with the negative and significant density parameter for Model A and non-significant but negative density parameter for Models C and D, the evidence suggests that students tend not to make positive affect nominations *unless* they are mutual or part of a cluster, suggesting high clustering of friendship groups and a level of mutual agreement on positive affect relations. Model B uses only simple social network structures, and by comparing it with Model C it is possible to see how some of the individual-level effects, such as homophily for personal masculine attitudes, change or are dampened when controlling for clustering and reciprocity.

Other effects are also present in the model. A negative and significant popularity effects for Models A, C and D suggests there is a ceiling effect on popularity – i.e. no few individuals are overwhelmingly popular. The negative expansiveness effect in Models A, C and D indicates that students do not make a large number of friendship selections – i.e. they choose a few people they consider friends. One could say that most people tend to be economical in their friendship choices. These effects are not surprising, but by controlling for these types of structures through these parameters, it is possible to make principled inferences about the actor-relation effects in the model.

5.1.3 Control effects

We note briefly that there were some effects for the control variables. In Model D, we see that there is a strong homophily effect for ethno-cultural background. In

¹ As a technical note, the estimation procedure successfully converged for all four models.

addition to this, there is a negative receiver effect for ethno-culture, indicating that students from non-dominant ethno-cultural backgrounds are more likely to receive positive affect nominations. Further for Model D, SES is important to social tie formation. The negative and significant sender effect for SES indicates that students with lower SES are more likely to make nominations of positive affect, or send more ties, than is expected by chance. There is also a significant and positive receiver effect from SES, indicating that students with higher SES are more likely to receive nominations of positive affect, or be more popular.

5.1.4 Personal attitudes and perceived beliefs for schoolboys

The primary interest of this research is in the effect of social tie formation when perceived beliefs are also examined. For this reason we focus upon Model D from Table 2 as it includes structural, individual and cultural factors in the examination of the schoolboy context. The difference between the results between Model C and Model D is important. What is apparent is the drastic change in parameter values for sender and receiver effects for personal MAI when perceived MAI is included into the model. Without perceived MAI in the model, personal MAI is not as important to social tie formation. Indeed, in Model C there is a significant and negative difference effect for personal MAI, indicating that students are homophilous in their relations with others regarding their personal attitudes towards masculinity. Yet the introduction of perceived MAI brings out a significant and negative sender effect for personal MAI, and a significant and positive receiver effect for personal MAI. This is striking evidence for an interaction effect between personal attitudes and perceived beliefs. In this case, the inclusion of perceived beliefs demonstrates an interdependent effect with personally held beliefs and both are necessary to understand the processes underpinning this network. Of further interest is the negative and significant receiver effect for perceived

MAI, given that there is a significant but positive receiver effect for personal MAI. This suggests that although popular students personally hold dominative masculine attitudes, they do not believe that most others hold these same beliefs. In fact, popular students believe that most other students hold non-dominative beliefs. So, although personal and perceived MAI are correlated in this dataset, popularity is obtained by those students who themselves have dominative masculine attitudes but “look down” on their fellows as not holding such an extreme position. Further, these popular individuals receive ties from individuals who believe a dominative masculinity is the norm within the network. This effect occurs above and beyond the homophily effects on personal and perceived MAI. It is not hard to construe this effect as evidence for the emergence of social hierarchy as people seek to exemplify a social prototype.

5.2 Example 2: Independent effects of perceived beliefs

We examine here a range of models for bullying relations within an all-male professional sporting team. Results are presented in Table 3. We have transformed the data for ease of interpretation such that senders of bullying ties represent those who bully others, while receivers of ties are the victims.

[insert Table 3 about here]

5.2.1 Structural effects

There are a number of structural effects for the violence relations of the club. In contrast to the school boys the local social structures, for the AFL club there are non-significant effects for reciprocity and clustering. This is not surprising for a network

based on negative ties (i.e. violence). Instead there is a both a significant and positive effect for expansiveness and popularity, indicating that some players are overly 'popular' as bullies but also as victims of bullying.

5.2.2 Control effects

The control variables do demonstrate important effects regarding social tie formation for the footballers. In Model D, a negative and significant receiver effect for relationship indicates that single men were significantly more likely to be the recipient of bullying. Further, bullying relations were much more likely between players of differing levels of experience, as noted by the significant and positive difference effect for experience. Interestingly, the inclusion of perceived beliefs brings out an homophily effect for experience (compare Models B and C with Model D).

5.2.3 Personal attitudes and perceived beliefs for footballers

In the context of this professional sports team we see an effect of perceived beliefs that is independent of personal attitudes. We focus again on the difference between Models C and D for the bullying relations for the AFL Club. Unlike the positive affect relations for the schoolboys, there are no significant effects for personal MAI for either of these two models. While the values of personal MAI change when including the perceived MAI beliefs, the personal attitudes have no significant impact on social tie formation. However, the inclusion of the perceived MAI beliefs does demonstrate that they are significantly related to both sending and receiving ties. Therefore footballers in this club with high perceived MAI are significantly more likely to bully others. Further, players with high perceived MAI are significantly more likely to be victims of bullying. Here we have the extreme situation where perceptions about the collective determine behaviors independently of personal motivations.

6. Discussion

Perceived beliefs are important in these two local contexts. The results demonstrate that including perceived beliefs can contribute considerably to an understanding of the social relations. When effects relating to perceived beliefs are included in the models the importance of other effects become more prominent. This is specifically the case for the schoolboys for effects relating to personal masculine attitudes. This indicates an interaction between personal attitudes and perceptions of general beliefs in explaining tie formation. Among the schoolboys, no support for the effect of personal attitudes towards masculinity was observed *until* cultural factors (perceived MAI) were introduced in the model. Personal attitudes and perceived beliefs interacted to explain the emergence of a positive affect hierarchy. The results suggest that boys obtain status and popularity in this hierarchy by trying to exemplify a particular masculine belief, and by generally looking down on their colleagues as not reaching or aspiring to such norms. The notion of a social prototype seems attractive here, and the fit with social identity theory seems plausible.

Even though personal and perceived MAI were highly correlated, a significant difference between personal attitudes and perceived beliefs existed in both local contexts, indicating that overall individuals perceive that masculine attitudes are more strongly endorsed than individuals personally endorse them. Yet the introduction of social network relations with personal and perceived beliefs demonstrates different types of relations between the two. So effects related to perceived beliefs are not just add-ons, but may interact with other effects. However, perceived beliefs may also have independent explanatory capacity. Among the footballers, bullies were not more or less likely to hold more dominative masculine attitudes. But perceived beliefs were significantly associated with bullying behaviors. So it is principally the perception by

individuals of the beliefs of those around them that may push players to engage in bullying. It may be that in this sporting club there is a pervading belief or shared norm suggesting that violent actions are permissible, and that those who perceive this norm as strongest are most likely to be implicated in violence, both as perpetrators and victims. The notion that “culture is a ‘tool kit’ for constructing ‘strategies of action’” (Swidler, 1998, p. 176) may well explain why players with no personal endorsement of violence but with perceived beliefs that violence is valued are more likely to bully others.

These effects for perceived beliefs raise a fundamental question of whether behavior is related to personal attitudes, to perceived beliefs, or some combination of the two. The range of theories reviewed above demonstrates the influence of perceived beliefs on behavior. Frosh *et al* (2001) state that boys in schools engage in a range of behaviors, depending upon if they are engaging with boys, with girls, or adults. The presentation of contradictory masculinities in these different scenarios is hardly likely to result from changing personal attitudes of the boys from one context to the next. Instead, the enactment of different masculinities is likely to be related to an individual’s differing perceptions of the norms of the context, which certainly interact with the personal attitudes of the boy and the specific social relations he has with others. However, the findings for the footballers suggest that certain contexts may invoke behaviors and relations (i.e. violence) through expectations or norms, and personal attitudes may indeed not be directly related to behavior.

These are interesting findings with regard to what is not a new question, though certainly an important one. The issue of whether behavior is related to personal beliefs or expected norms was perhaps most famously discussed regarding the treatment of Jewish prisoners-of-war by the Nazis. The Nuremberg Trials demonstrated how senior Nazis claimed to be merely following orders, denying their complicity in the events of World War II and the genocide of Jews in Nazi concentration camps. While the

arguments can be seen as an attempt by individuals to exonerate themselves by distancing their own intentions from perceived norms, there is no doubt that culture does have a dramatic impact on individual action. But questions of position of power are obviously related to the effects that expectations have. That senior Nazis claimed to be the victims of expectations seems less feasible than if they were low ranking soldiers, a point not lost on the judges in the sentences handed down. This is not to suggest that lower tiered individuals should be excused from such actions. Rather, it is to make the point that with less power one may feel more susceptible to expectations and norms². This is perhaps one conclusion to draw from the Milgram Experiment (1963) in which participants inflicted ‘electric shocks’ onto other individuals at the request of the experimenter. While these ‘electric shocks’ were in fact faked, the research participants were unaware of this deception because of actors who “received” the shocks pretending they really were inflicted. The results indicated an overwhelming tendency and capacity of people to engage in behaviors that went against their personal beliefs because they felt compelled to act in accordance with the expectations of an authority figure. Though subsequently issues have been found that problematise Milgram’s results, the question of the role of power relations, personal attitudes and perceived norms of behavior remains important and unresolved.

The examination of perceived beliefs in two local social contexts in this research has been primarily exploratory, and is specific to beliefs about masculinity. Yet it is obvious that the insight gained from including perceived beliefs could be generalised to include perceptions of other attributes. Additionally, further theorizing about specific ways in which perceived beliefs may operate in relation to personal attitudes and local social structures may provide an enriched an understanding of the mechanisms and processes that people engage with in their social world.

² However, it does raise the question of whether individuals at the top feel more pressure to adhere to what they perceive is in the interests of others, though obviously in the case of the Nuremburg Trials, who

7. Conclusion

This research has provided the innovative step of including perceived beliefs as node level variables in statistical models for social networks. We see an individual's perception of the beliefs of others as indicative of collective judgments, cultural agreement and possibly norm-based standards. We have shown how an individual's perceptions of the beliefs of others can have an impact on social tie formation. The inclusion of the perceived beliefs of others as a node-level variable within an existing methodological p^* modelling framework aligns theory with method by engaging the interdependent effects of structural, individual and cultural factors in specific local settings. Incorporating perceived beliefs as a node-level variable in p^* models may be useful in a wide range of network studies and provide insight into the culture of particular local settings.

8. References

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the 'others' are is a pertinent question.

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TABLES

Table 1: Parameters used in higher order p^* models

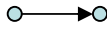
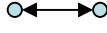
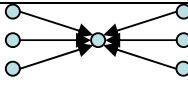
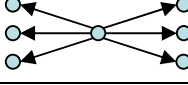
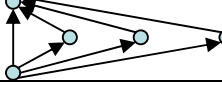
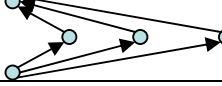
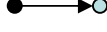
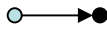
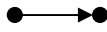
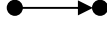
	Parameter	Image	Explanation
1	Density		One actor nominating another actor (baseline propensity to form ties)
2	Reciprocity		Mutual ties between two actors (models the tendency for reciprocation across the graph)
3	Popularity		Indicative of the presence of highly nominated individuals within a network (models the indegree distribution)
4	Expansiveness		Indicative of the activity of actors to engage many others (models the outdegree distribution)
5	Clustering		Triadic clustering (i.e. a friend of a friend is a friend)
6	Multiple connectivity		Two actors are connected through multiple others but not directly
7	Sender		The attribute of the sender of the tie, which may be continuous, categorical or binary (models the propensity of an actor with the attribute to send ties, i.e. to be active in network terms)
8	Receiver		The attribute of the receiver of the tie, which may be continuous, categorical or binary (models the propensity of an actor with the attribute to be popular)
9	Homophily (for binary variables)		The propensity of a person with a binary attribute (e.g. "sex") to choose other persons with the same attribute
10	Homophily (for continuous variables)		The propensity of a person with a continuous attribute (e.g. "age") to choose persons with a similar or different amount of the same continuous attribute

Table 2: Four types of p^* models and their estimates for positive affect relations among the schoolboys ^a

Parameter	Model			
	A Structural	B Individual	C Structural & Individual	D Structural, Individual & Cultural
Structural effects				
Density	-1.62 (0.47)*	-4.28 (1.40)*	-1.46 (1.11)	-1.89 (1.40)
Reciprocity	2.29 (0.26)*	4.19 (0.23)*	2.36 (0.27)*	2.41 (0.28)*
Popularity	-1.00 (0.25)*		-1.11 (0.27)*	-1.16 (0.28)*
Expansiveness	-0.68 (0.28)*		-0.77 (0.28)*	-0.82 (0.30)*
Clustering	1.39 (0.10)*		1.40 (0.11)*	1.42 (0.11)*
Multiple connectivity	-0.09 (0.04)*		-0.08 (0.03)*	-0.07 (0.04)
Actor-relation effects (Personal attitudes and perceived beliefs)				
Homophily - Personal attitudes		-0.18 (0.07)*	-0.13 (0.06)*	-0.24 (0.07)*
Homophily - Perceived beliefs				0.16 (0.09)
Sender - Personal attitudes		0.03 (0.09)	0.003 (0.09)	-0.33 (0.13)*
Sender - Perceived beliefs				0.43 (0.15)*
Receiver - Personal attitudes		0.04 (0.09)	0.03 (0.09)	0.39 (0.17)*
Receiver - Perceived beliefs				-0.45 (0.17)*
Actor-relation effects (Control Variables)				
Homophily – Ethno-culture		0.77 (0.21)*	0.41 (0.11)*	0.44 (0.14)*
Sender – Ethno-culture		-0.11 (0.18)	0.02 (0.16)	-0.001 (0.17)
Receiver – Ethno-culture		-0.47 (0.19)*	-0.35 (0.17)*	-0.38 (0.19)*
Homophily – SES		-0.002 (0.0012)	-0.0016 (0.001)	-0.0018 (0.001)
Sender – SES		-0.004 (0.001)*	-0.004 (0.0015)*	-0.003 (0.0015)*
Receiver – SES		0.004 (0.001)*	0.004 (0.0015)*	0.004 (0.0016)*

^a Goodness of fit statistics were calculated only for Model D given this is the most difficult model to fit by virtue of having the largest number of parameters to examine. An excellent fit was found for Model D, with all included parameters <0.1 for their t -statistics. Non-included parameter t -statistics were all below 2, as is to be expected for good fitting models. The global parameter t -statistics were all below 2, with the exception of the skewness of the outdegree distribution (2.71). Such a result is not unusual, and indicates that there was some difficulty modelling the outdegree distribution. Yet we can consider this the best fitting model we could identify, and nonetheless consider fit statistics as excellent.

Table 3: p^* model estimates for *bullying* relations among the footballers

Parameter	Model			
	A Structural	B Individual	C Structural & Individual	D Structural, Individual & Cultural
Structural effects				
Density	-5.08 (0.36)*	-3.54 (0.86)*	-5.43 (0.84)*	-6.49 (0.93)*
Reciprocity	0.28 (0.67)	0.32 (0.66)	0.25 (0.68)	0.13 (0.69)
Popularity	0.73 (0.23)*		0.63 (0.26)*	0.62 (0.28)*
Expansiveness	1.05 (0.22)*		1.03 (0.23)*	0.98 (0.25)*
Clustering	-0.15 (0.27)		-0.18 (0.29)	-0.24 (0.29)
Multiple connectivity	-0.00 (0.05)		0.02 (0.06)	0.01 (0.06)
Actor-relation effects (Personal attitudes and perceived beliefs)				
Homophily - Personal attitudes		0.26 (0.23)	0.20 (0.19)	0.11 (0.21)
Homophily - Perceived beliefs				-0.03 (0.20)
Sender - Personal attitudes		0.04 (0.19)	0.02 (0.14)	-0.19 (0.17)
Sender - Perceived beliefs				0.40 (0.18)*
Receiver - Personal attitudes		-0.02 (0.19)	-0.02 (0.16)	-0.29 (0.20)
Receiver - Perceived beliefs				0.44 (0.20)*
Actor-relation effects (Control Variables) ^b				
Sender - Relationship		0.03 (0.43)	0.01 (0.35)	-0.12 (0.39)
Receiver - Relationship		-1.76 (0.56)*	-1.32 (0.57)*	-1.55 (0.65)*
Homophily - Playing ability		0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Sender - Playing ability		-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Receiver - Playing ability		0.00 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Homophily - Experience		0.0042 (0.0024)	0.0035 (0.0020)	0.0048 (0.0024)*
Sender - Experience		0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Receiver - Experience		0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

^b There is no homophily effect for the *Relationship* parameter as there are no such ties in the network.