THE DILEMMA OF GROUP MEMBERSHIP IN THE INTERNET AGE: PUBLIC KNOWLEDGE AS PREFERRED MISINFORMATION

MIIKA VÄHÄMAA
MARK D. WEST

Abstract

A commonly accepted assumption is that scientific knowledge on the part of the general public would increase in an era of increasing ease of access to all forms of information. This argument suggests that the public only needs to take an advantage of an inexpensive laptop computer to be superbly informed. However, what appears to be the case is that the public appears to be more prone than ever to misinformation, partial truths, and "spin." Research shows that, even when it comes to scientific knowledge, we have socially-mediated preferences; we prefer those beliefs that we like and that are considered reasonable by our peers. Importantly, our "peers" can in our hyperlocal world be virtual or real. Thus, social group membership merges with our individual likes and dislikes to shape what we take as "knowledge." Groups, therefore, become platforms of social epistemologies. We examine our argument from the viewpoint of the United States using a large data set from the General Social Survey. We employ the 2008 topical module to examine the relationships between attitudes and knowledge concerning science and technology, the relationship between media use, demographic group variables, and group-related attitudes toward science.

Miika Vähämaa is Researcher in the Department of Communication, University of Helsinki; e-mail: miika.vahamaa@gmail.com.

Mark D. West is Professor of Communication at the University of North Carolina at Asheville; e-mail: west@unca.edu.

Introduction

In an era of increasing availability of all forms of information, reason would suggest that scientific knowledge on the part of the general public would increase.[1] The mere increase in the amount of information, passing through fewer intermediaries, would imply that the level of information on the part of the public would be greater. However, an examination of social knowledge on topics such as anthropogenic global warming, cryptids such as "Bigfoot," and related topics suggest that the public is not only prone to a variety of misinformation, partial truths, and "spin," but that the realm in which such misunderstandings arise is the *social*. Individuals join groups, both large and small, for reasons having little to do with learning. But while in those groups, they indeed learn, and one of the things they learn is attitudes toward learning itself. The research presented here, which uses data from the U.S. General Social Survey 2008 module on attitudes toward science suggests, corroborates these claims.

We suggest, following Habermas (1984, 11; 2005; 2006, 420) that the public use of reason is the mode through which political interest groups seek to advance claims about public goods; these claims may be debated, and the public or other interest groups may use empirical or rational means to select some proffered claims as correct, while rejecting others as incorrect. On the other hand, the public as a whole, or smaller groups, may select which claims to view as correct on emotional, political or other grounds. Habermas, as a "young Hegelian," tends to view the public sphere, when operating properly, as producing "knowledge" in this epistemic sense via rationality; but that is a philosophical *donnée* about the nature of advances in knowledge rather than an empirical claim.

Such advances have a socio-psychological dimension; the self as a part of a social world is potentially bettered through this Habermasian use of reason while at the same time the status of the social self is improved through the bettered state of the body politic (Warren 1993). As such, this Habermasian "unfolding of modernity" (Eisenstadt 1999) is at once a linguistic, psychological and philosophical movement, laying the groundwork for (among other things) a social epistemology which salvages a basis for knowledge formation within the social domain of public interaction without the need for transcendental philosophical explanatory models (Cooke 2006). And yet, the basis for such claims is the notion that individuals, or groups, rely on relatively obvious procedures of rationalistic knowledge acquisition and formation. Such procedures – say, the hypothetico-deductive method, with its use of both induction and deduction – are indeed straightforward, reliable and valid. What they are not, as the English-language maxim holds of common-sense, is *common*. What *is* more common is a general tendency of humans within social groups to create social standards, or social epistemologies, to define what *knowledge* is understood to be.

To put our research question more formally: In the light of the availability of such straightforward procedures for knowledge formation and acquisition, why has public knowledge concerning scientific issues lagged behind the knowledge available to elites? Despite the widespread availability of books, magazines, and Internet sources of knowledge, much of the public appears to have insufficient knowledge concerning scientific issues to be able to make reasoned political choices

concerning these vital matters. Why, when massive research databases are readily available, does much of the public appear to be so ill-informed concerning public policy questions concerning science? Is science simply uninteresting to the general public? Or is there some structural reason which makes the public ill-informed?

One approach to this question comes from the way in which corporate ownership has transformed media in recent decades. In particular, some commentators have attributed this phenomenon to the increasing tendency of media outlets to engage in "horse race" coverage (Broh 1980); such coverage has the effect of creating an artificial "middle point" where the positions staked out by the two parties appear to define the limits of discourse, with an arbitrary "middle" representing the centroid of what "reasonable people" (a group which is plausible, imaginable and yet unreal) would think (Kuklinski and Sigelman 1992, 811).

As an example, we might consider the issue of anthropogenic climate change. Media coverage, at least in the Anglo-American realm, seeks to portray "both sides" of the issue, presenting the evidence proffered by those who are scientists studying climate change and those who deny its existence. While what actually exists in the public realm are people who deny the existence of anthropogenic climate change, and those who accept its existence, what seems to exist in the public mind concerning the opinions of others is this "artificial centroid": the notion that there is some sort of "middle ground" in which informed individuals *as a whole* believe there is still some scientific debate being waged about whether climate change is anthropogenic or not. There is not such a "middle ground," nor is there such a corpus of "informed individuals" who are reserving their judgement for more information; the consensus has long since formed among those who are well informed on scientific matters that climate change is caused by the actions of humans. But the actions of the media, attempting to "play fair," create that impression among those who are *not* well informed on scientific matters.

These "artificial centroids" still exist, we propose, in a variety of domains outside of the issue of climate change. Due to the variety of information available through multiple media sources, we have a variety of what seem to be "reasonable middle points" – points and views that the general or a particular "folk" would approve. In a world of almost unlimited viewpoints, audiences seek out a broad (but by nature limited) range of media, and find what seem to them to be a reasonable middle point – and then *rationally* believe others (who have engaged in a similar ratiocinative process) who disagree with them to be *irrational*.

The availability of diverse beliefs through different media in itself, we argue, does not create misinformation or knowledge gaps. Rather, it appears that the rapidly increasing number of centroids of beliefs – beliefs that are not generally viewed as extreme or radical but rather resemble the golden mean and which represent what is seen as "reasonable" – speak to the fact that contemporary human society is as much if not more than before driven by more emotionally-directed preferences than by rational processes of information gathering.

Much of this process of information gathering happens in the social realm. Individuals are not, in the overwhelming vastness and complexity of modern society, able to gather the information they need to be functional members of society by themselves. They rely on media, social networks, and, increasingly, on intermediate formulations like social media for the acquisition of knowledge, under the

guidance of emotional as well as rational constraints. Membership in institutions like Facebook – which indeed serve the adjunctive purpose of knowledge dissemination – have for most members the primary purpose of fulfilling various social gratifications (Raacke and Bonde-Raacke 2008).

Due to market pressures, various types of media with their diverse contents are appealing to people pursuant to their likes and dislikes – likes and dislikes which arise from individual embeddedness in social groups (Tajfel 1982, 21–2; 1978; Dwyer 1990). In the same way that researchers in the 1950s and 1960s discussed a "knowledge gap," we posit here an "appeal gap" – a dividing line between social groups. Who you know once again determines what you know; not because you do not have access to information, but because what the people you *like* believe has a powerful influence on what *you* will believe.

Social Groups and Cultivation Effect as Antecedents to Knowledge

Research shows that, even when it comes to scientific knowledge, we like some things better than others; we find that those beliefs that are considered reasonable by our peers are more appealing than other beliefs (Hewstone 1990; Morton and Duck 2001; Morton et al. 2006, 836). But we posit that those likes do not arise from nothing; they arise from our connectedness in social networks, since we need our peers to function as individuals in our socially and electronically-networked lives. Thus, our interests are to a large extent defined by our peers, whether those peers are "flesh-and-blood" or virtual.

People want to be reasonable, and they want to be happy, as suggested in studies by Julia Annas (2004, 43–6) and Miika Vähämaa (2013, 4). As common sense and thought from antiquity to modernity suggests, if they must choose between rationality and happiness, they will choose happiness (Annas 2004, 43-6; Fredrickson 2004). To reach this eudaemonistic – a happiness-oriented – goal, they join groups, in which they seek others with whom they can have a variety of pleasant affective states (mutual esteem, emotional attraction, ability to make sense of self and others, and the like) (Turner 2010). In such social groups, there are powerful forces moving people toward cognitive consistency with others, forces which have complex causal relationships with one another (Eveland and Shah 2003; Friedkin 2004).

We assume that reason, group membership and pursuit of personal happiness are powerful imperatives when we acquire social knowledge. The appeal to maintain positive affective states, to sustain a felt sense of being reasonable and to maintain good standing as a group member serve as catalysts to media choice, decision-making and knowledge formation, not vice versa; the direction of this causal relationship has long been recognised in marketing and advertising (Arnett and Terhanian 1998) but has only recently become a focus in the study of public knowledge formation, as a review of recent research in social epistemology shows (Vähämaa 2013, 3–20). As Vähämaa suggests, the reasons why people join social groups are straightforward; they hope to better themselves in some way; they hope to be entertained, to gain by their joint effort desirable political outcomes, or to gain some other benefit not possible to an unaffiliated agent. During the duration of group membership, whether this "belonging" is electronically mediated or "face-to-face," some sort of learning is very likely to happen.

The Cultivation Hypothesis and How Learning Creates Publics

Interestingly, social scientists have paid little attention to a large body of research attesting to the learning that results from being a member of a television audience. Viewers do not watch entertainment programming with the overt goal of learning; as the uses-and-gratification literature suggests, their primary motivation is entertainment, with secondary social gratifications available to mutual viewers of television programs or consumers of other media (Katz, Gurevitch and Haas 1973; Giaccardi 1993). But if learning nevertheless occurs, it should be empirically observable, and, as such, would have epistemic consequences.

Such indeed is the case, as is well documented in the body of literature clustering around the cultivation hypothesis. First formulated by George Gerbner (1970), and then expanded upon by a wide variety of researchers, cultivation researchers have recently suggested that viewers of television tend to come to think of the risk of violence within their community as greater in proportion to the amount of television they view. The impact of television is not linear (Diefenbach and West 2001, 433), nor are the effects immediate or massive (Morgan and Shanahan 2010), nor is such learning volitional. The vast body of research in cultivation shows that viewers learn from watching television in domains as distinct as community safety, sexuality and self-esteem (Potter 1993; Brown et al. 2006). For a student of public knowledge formation this truly matters, since it shows that formation of social epistemologies may be studied empirically.

These processes of viewing choice are a real and empirical aspect of knowledge creation. One has to "like" a television show to select it; upon selecting it and viewing it, one "learns" something, without volition. In the traditional cultivation model, one learns that one's community is dangerous, because one views more violent crime on television than in the everyday world. This is an example of how the public, through a social aggregation (the aggregate group of viewers of a violent program), "learns." Hence, as suggested above, "liking something," or to be more specific, a social membership, can be *empirically* shown to be a factor that leads a group member towards "knowledge," or, again to be specific, a given epistemic stance toward information.

In more general terms, we citizens around the world probably have more information available than ever before, but there is no reason to assume that the Internet is somehow "more" or "different" than other media systems (West 2013). But the *manner* in which people use or consume those facts has not necessarily changed how we learn, or do not learn, that information. Electronic media serve as a new delivery system for information; but they have not changed the human embeddedness in the social world which serves as the matrix via which humans construct understanding (Vähämaa 2013, 14–15).

The mere increasing availability of information, as foreseen decades ago by Marshall McLuhan (1994), has not led to a more informed public about scientific facts *per se* (Goven 2006). As social beings, we emphasise our social preferences, even when learning. That fact means that we are on the path to misunderstanding the role of the social, and in particular the role of emotion, in knowledge acquisition, if we do not give substantial consideration to group memberships (García-Murillo and Annabi 2002).

"Appeal Gap," the Public and the Statistics of Knowledge-formation

Due to our personal likes and dislikes, anchored to our social groups, we may seek out knowledge confirming group norms through our choice of media sources. We do that in order to maintain all-important group memberships. Such behaviour, while difficult only a few decades ago, is now possible in the modern "narrow-casting" era of multiple cable news channels. (Kuklinski and Sigelman 1992). We can select media which are pleasant and which are enjoyed by our peers; those will tend to be those media which confirm the views held by us and by our peers. Those views, even if they are about empirical and verifiable facts, may be in error. They may be deliberately manipulated, as in the case of propaganda; or they may be mistakes; regardless, *liking* and *preferring*, as aspects of our social being, will have led us into epistemic error.

The fact that *to like* and *to prefer* are important aspects of knowledge gathering (Otten 2002) makes it crucial to ask: Through which sources do individuals get their information? Research suggests that media use and media exposure vary significantly with the most fundamental demographic factors such as age, race and household socioeconomic status. Media exposure peaks at almost eight hours daily among young adolescents, and is negatively related to indicators of socioeconomic status (Roberts and Foehr 2008). There is evidence, especially in the USA context, pointing to the existence of a "digital divide," variations in access to personal computers and allied technologies by socioeconomic status and by race and ethnicity (Block 2004).

However, research has suggested that an increased level of media choice and access to digital forms of information has meant the increase of knowledge gaps (Prior 2005). We argue, as an adjunct to the digital divide theory, that another paradoxical result of ubiquitous media availability and use is an *increase* of knowledge gaps, caused by user preferences. Research has in general focused on the knowledge gap phenomena as an aspect of unavailability – the lack of availability of Internet technology, like the lack of availability of television for prior generations of those in lower socioeconomic categories, has led to a knowledge gap between high socioeconomic status individuals and those of lower socioeconomic status.

This may have been true before the Internet. In an age of ubiquitous media, the variable which matters most is *appeal*. If people are uninterested in science or actively disdain it, then those people have placed themselves at risk of a knowledge gap which may be less tractable to amelioration by federal, state or private efforts to make information technologies available or to conduct public information campaigns. If people simply do not care for science, then it may be the case that there is a knowledge gap created by some sort of *preferential divide* rather than a socioeconomic divide. If this is the case, then modelling the social antecedents of interest in science may be a critical starting place in understanding the function of knowledge within mass media systems. We examine the public exposure to scientific media contents as a whole and see how the media choice, socio-economic group variables as well as personally perceived "interest" and "appeal" towards scientific knowledge might influence what the public knows. In what follows we provide an example of how one could examine empirically the provocative theo-

retical assertions of the "appeal" gap toward science with some basic analysis of the General Social Survey 2008 in the USA.

Research Questions

With our data we pursue answers to two research questions with a focus on large-scale group factors and the experienced appeal to science via various media. Awareness of the factors leading to large-scale knowledge gaps can be of programmatic assistance in knowledge campaign planning and in the development of education that revolves around our experiences of science and its relevance to citizenship through voting and influencing public choices.

Our research questions are as follows:

Do similar aspect of socioeconomic status and media choice alter opinions concerning science per se?

While we know a good bit about the knowledge gap insofar as it alters what people know, does an individual's preferred medium for information, all other things considered, change the appeal of important topics like science?

Methods

Data was collected by the National Opinion Research Center in their 2008 data collection cycle for the General Social Survey. The questions concerning knowledge, interest and perceptions of science were part of a special survey module which has been used periodically by NORC. From this module, some 21 variables were selected for the initial analyses, and, after listwise deletion, some 1263 cases remained for full analyses.

Data were analysed using Stata version 11. In particular, module REGRESS with option XI (for dummy variable expansion) was employed. Initially, a variable describing overall interest in science was created using a common factor analysis without rotation from questions concerning respondent interest in medicine, interest in military science, interest in overall science, interest in space sciences, and interest in technology.

The extracted factor was labelled "interest in science," and was used as a dependent variable in the regression equations. A second variable, describing attitude toward science, was extracted from responses to create an independent variable to be tested against the "interest in science" variable. This derived independent variable was constructed from questions concerning positive effects on the next generation, whether or not science was moving too rapidly, and whether or not science was beneficially advancing the frontier of knowledge. The variable extracted through this common factor analysis was labelled "attitude toward science," and was used as an independent variable in the regression analysis.[2]

All in all, we extracted two variables from the raw data using common factor analysis. The first variable extracted was dependent variable describing the respondents´ "interest in science." The second extracted variable was created to be used as an independent variable as a backdrop against the interest factor and was labelled as the respondents´ "attitude toward science." If a group of people, hypothetically speaking, would appreciate science a lot it would make sense that such a group would have high interest in science as well. However, it is interesting to see which other factors besides attitudes would group up as social determinants of interest in science *per se*.

Results

A standard array of socioeconomic variables, as well as questions concerning which medium respondents said they used for the majority of their information needs, which medium they used when they were interested in science, and questions about their attitude toward science, were collected.

As shown in Table 1, in the OLS regression, 17 percent of total variance was explained, and the regression itself which sought to model interest in science was significant at the .01 level. Education, race, the use of the Internet as a primary information source, the use of electronic media as a primary information source, the use of electronic media as a primary source of information about science, and a positive attitude toward science were all predictors of interest in science.

What we see here is that different social groups have differing perceptions about science. Social groups – based largely on the traditional sociological categorisations provided by socioeconomic status – can be shown to have different levels of interest in science. Some groups, groups which follow traditional sociological categorisation, think science "matters" more, some groups think science "matters" less. As such, we have a causal model presenting an empirical indication of a functioning social epistemology whose outcome is individuals who think that science is less interesting than do those in an alternative group.

Table 1. Regression of Socioeconomic Variables, News Sources, and Overall Attitude Concerning Science on Interest in Science

	Coefficient	s.e.	T
Education	-.029	.008	-3.6 *
Income	-.013	.010	-1.3
Is R White?	-.265	-.043	-6.0 *
Is R Male?	-.045	.052	-0.8
Internet primary info source	-.151	.076	-1.9 *
TV or radio primary source	-.145	.059	-2.5 *
Internet primary science source	.098	.067	1.4
TV or radio primary science source	.184	.056	3.2 *
Attitude toward science	.375	.030	12.4 *
N = 1263, F(9, 1253 = 28.48), p=.000*, R2 = .1698. * = significant at the .05 level.			

Note: Lower levels of education, a more positive attitude toward science, the use of television or radio as a primary science source, *not* using the Internet as a primary source of information, *not* using television or radio as a primary source of information, and *not* being White were all significant predictors of higher levels of interest in science. These factors predicted 17 percent of the observed variance, and the model was significant at the .01 level.

Distributionally, the measure of interest in science appeared to be normal, as suggested in the quantile-quantile plot shown in Appendix 1. The linearity of the quantile-quantile, as well as the lack of apparent outliers or "drift" at the ends of the posited distribution, argue in favour of a normally distributed variable. The explanatory power of the model seems adequate; explaining 17 percent of a

attitudinal variable such as interest in science seems reasonable considering the substantial number of idiosyncratic aspects of such a socio-psychological attribute such as an interest in a broad subject. This regression suggests that those who use the Internet as a primary information source, for example, tend to think that science is less interesting than do those who rely on television as a primary news source. Those who rely on television are told how science reveals interesting new findings which may lead to new and exciting outcomes, or to understand the controversies surrounding current debates. Contrariwise, those who rely on the Internet are more likely to see carefully curated Wikipedia pages.

Consider the case of John R. Christy, a climate-science denier with a master of divinity from a conservative Baptist seminary whose primary data analyses of satellite data has been re-examined by others to find results more in line with mainstream scientists, whose research publications have been largely funded by fossil-fuel producers, and whose controversial career has been detailed in newspapers and television, but only scantily on the Internet (Antilla 2005). The Wikipedia page on John R. Christy, however, touts only his achievements and glosses over the controversies concerning his research. Controversy concerning his debatable research methods, as well as whether or not global warming is occurring, is available on the Internet as well. And yet, this material is difficult to find since it is buried under an avalanche of advocacy advertising, largely sponsored by various agencies sponsored by commercial interests.

How might a casual observer respond to Christy and the attendant controversy? In reality, there is no "middle ground"; Christy is not qualified to do analyses of climate change, nor is the opinion of a few enough to change an overwhelming scientific consensus. But the "both sides" tendency of coverage of controversy would lead most individuals to defer judgment unless the social groups of which they are a part had formed their own consensus. Such has happened in the Anglo-American social realm, where right-wing social groupings have made opposition to anthropomorphic climate change an aspect of a larger political movement involving general objection to governmental interventions against corporate action. Individual decisions concerning anthropomorphic climate change are scarcely rational, in the best circumstances (Leiserowitz 2006); with the limited information available to the casual consumer, whose knowledge is shaped by group memberships which in turn shape individual preferences, it is little wonder that the political process in the Anglo-American sphere has led to perverse outcomes.

As suggested in Table 2, the regression model makes it possible to draw up a profile of the most likely sort of person to be interested in science. Thus, we are able to profile some key characteristics of a public in the context of the United States which credits science as useful and which makes up a statistically coherent group of people who tend to be highly interested in science. These individuals, as suggested in the prior discussion, represent a group of people who have coherent demographic characteristics and who are statistically likely to have been affected by their media consumption in *epistemological* terms. In particular, we see that the use of the Internet as a primary news source makes people less likely to think of science as "interesting," while the use of television as a primary news source makes them more likely to be interested in science. These characteristics are associated with demographic traits which are assuredly antecedent to media use – arguing for

a social grouping which, in turn, argues that what we observe here is a functioning social epistemology.

Table 2: Summaries of Predictive Variables from Regression by Low and High Values of Derived Interest Factor

	Lower Interest		Higher Interest	
Education	Higher	-.161	Lower	.138
Income	Higher	-.065	Lower	.162
Is R White?	Yes	-.036	No	.119
Appreciates science	No	-.323	Yes	.159
Internet is main source	Yes	-.233	No	.043
TV is main source	No	-.122	Yes	-.063
Internet is science source	No	-.157	Yes	.120

Who, in the light of the regression model, are these people interested in science mediated via various channels of public media? Our data shows that the *in-group* (as conceptualised by Tajfel 1982, 21–2) members of people who like science are likely to have lower educational attainment than the mean, and to be non-white. Their income will be lower than the mean, and they will describe themselves as "appreciating science." Television, perhaps surprisingly, is their main source of news, and they are less likely than most to turn to the Internet for news – although they seek out science news on the Internet.

It seems that it is, indeed, possible to locate some large-scale socio-demographic group variables that determine what we are truly interested in and how we pursue those interests. Our study is limited to the context of the United States and focuses on public broadcasts concerning science, but we are nevertheless able to see how people truly tend to group around themes and interests. We contend, therefore, that it is possible to use standard social science methodologies to locate and analyse some principal characteristics of these social groups. These groups, it appears, can oftentimes be virtual as well as "real"; the virtual groups nevertheless have real impacts upon public perception. In any event, it seems that social groups alongside cultivation and media choice play a role in creating public interest in what happens in our world and through which media we should be interpreting the developments of our world.

Conclusions

This research suggests that, at least in the context of the United States, socioeconomic group variables play a substantial role in people's interest in science. But so does media choice – which, in itself, is a matter of both personal and social choice.

The interests of individuals seem to be idiosyncratic when it comes to science, and the levels of interest of individuals are in line with their group memberships in societies when considered in the context of some basic socio-demographic variables. We thus claim, based on our findings, that individuals create knowledge as a result of the influence of social knowledge which they gain from the media. Individuals

create knowledge through their social encounters in order to maintain social status. These views co-vary with a variety of psycho-social variables, most notably with socio-economic status. This implies that quasi-experimental methods such as sociological surveys – like the one used in this study – can be used to examine the formation of knowledge in both individuals and groups.

What is observed in the data collected here is that higher education and income and higher overall socioeconomic status appear to be associated with a lower level of interest in science. This may stem from a higher level of scepticism about the benefits which science will bring the life of any given individual. In general, the optimism of the 1950s has long since been replaced, amongst most educated Americans, with a wide-ranging belief that scientific progress is invariably matched with threat and risk brought about by new technologies (deVries 1990); scientific progress is itself construed as a social problem (Restivo 1988, 207). But it may be the case that for those in the lower socioeconomic strata, scientific progress is still seen as a mechanism by which life problems – already solved for those in higher socioeconomic strata – may be ameliorated.

Perhaps the most interesting finding of this research is that a predictor of interest in science is using television as a primary source of information. Whether or not such shows are always accurate, they *always* strive to be entertaining – and, as such, they draw viewers into a world in which scientific pursuits are interesting, and scientific research is shown as a dramatic and eventful and as a whole *likable* mode of human endeavour. As such, then, it makes sense that those who rely upon television as a primary source of information might find science more appealing due to social reasons than those elements of the population who relied on other media. Thus, individual interest appears to be influenced by large-scale group variables and speak to the fact that knowledge is composed of substantial, statistically observable, social component parallel to more individual self-centred preferences. For future studies, this would imply that group and demographic measures may be powerful explanatory variables in quasi-experimental models that measure people's knowledge on any given public issue.

Also, we found that those individuals who become interested in science by virtue of using the television and radio as their primary source of news do not remain in that passive mode; they then turn to the Internet to seek out further information. Such active information seeking indicates that the respondents who describe themselves as more interested in science use the Internet to find out things, seeking further information – since their primary news source *as a whole* is television and radio. This disparity – which indicates that media consumers are at some point a passive audience, at some point an active audience – shows the changing nature of the media audience as they seek out the gratification of the needs of the self in an increasingly complex and rich mediated environment. In today's media environment, scientific information is only one available field of interest for the public – despite its importance to the future of the world – and is mediated by its appeal as much as by its importance.

In sum, then, interest in science appears to be predicted by socio-economic variables, including media use. This leads us to conclude that there exist large social groupings, tractable to empirical study, which have divergent epistemic stances on scientific issues; we contend that to think that science "matters," or to think that

science does "not matter," is to have radically different conceptualisations of how to think about the world. At that point, an empirical study has lent at least some credence to the notion of epistemic groups, and we believe that we can hence argue for the notion of a positivistic approach to the study of group epistemologies.

Notes:

1. It is crucial to note, however, that knowledge found in the social world is not treated here as a veritistic, truth-oriented, object that remains in the final analysis largely as a token managed by individual minds preconditioned with a singular and proper set of veritistic justification (Gilbert 1987; Tuomela 1995; Goldman 1999; Fallis 2007; Kitcher 2002). We argue that there already exists an empirically-oriented body of research on the collectivity of knowledge that points in a different direction (Hewstone 1990; Shapin 1994; Bergin 2001; Habermas 2006; Oppenheimer et al. 2007; Mathiesen 2007; Kellstedt et al. 2008; Nisbet and Kotcher 2009; Wide 2009; Vähämaa 2013) – that knowledge is a construct generated by variety of social norms and desires and that no singular epistemology is pervasive enough to explain the asymmetries that arise time and again in the communication of knowledge (Hamill 1990). Although individuals undoubtedly have the ability to arrive at true beliefs with the help of commonly agreed set of qualified justifications (Tuomela 1995; Fallis 2007), in most social interactions knowledge easily escapes any singular criteria of truth.

2. These scales were created for data reduction purposes, both for the measures of respondent interest in science and for respondent attitudes concerning science, by conducting maximum likelihood factor analyses without rotation upon the survey items dealing with those questions.

References:

Annas, Julia. 2004. Happiness as Achievement. *Daedalus* 133, 2, 44–51.

Antilla, Liisa. 2005. Climate of Scepticism: US Newspaper Coverage of the Science of Climate Change. *Global Environmental Change* 15, 4, 338–352.

Arnett, J. Jensen and George Terhanian. 1998. Adolescents' Responses to Cigarette Advertisements: Links Between Exposure, Liking, and the Appeal of Smoking. *Tobacco Control* 7, 2, 129-133.

Bergin, Lisa A. 2001. The Role of Truth When Communicating Knowledge across Epistemic Difference. *Social Epistemology* 15, 4, 367–378.

Block, Walter. 2004. The "Digital Divide" Is Not a Problem in Need of Rectifying. *Journal of Business Ethics* 53, 4, 393-406.

Broh, C. Anthony. 1980. Horse-Race Journalism: Reporting the Polls in the 1976 Presidential Election. *The Public Opinion Quarterly* 44, 4, 514–529.

Brown, Jane D., Kelly Ladin L'Engle, Carol J. Pardun, Guang Guo, Kristin Kenneavy, and Christine Jackson. 2006. Sexy Media Matter: Exposure to Sexual Content in Music, Movies, Television, and Magazines Predicts Black and White Adolescents' Sexual Behavior. *Pediatrics* 117, 4, 1018–1027.

Cooke, Maeve. 2006. Salvaging and Secularizing the Semantic Contents of Religion: The Limitations of Habermas's Postmetaphysical Proposal. *International Journal for Philosophy of Religion* 60, 1–3, 187–207.

Diefenbach, Donald L. and Mark D. West. 2001. Violent Crime and Poisson Regression: A Measure and a Method for Cultivation Analysis. *Journal of Broadcasting & Electronic Media* 45, 3, 432–445.

Dwyer, John. 1990. The Imperative of Sociability: Moral Culture in the Late Scottish Enlightenment. *Journal for Eighteenth Century Studies* 13, 2, 169–184.

Eisenstadt, Shmuel Noah. 1999. Multiple Modernities in an Age of Globalization. In C. Honegger (ed.), *Grenzenlose Gesellschaft?,* 37–50. VS Verlag für Sozialwissenschaften.

Eveland, William P. and Dhavan V. Shah. 2003. The Impact of Individual and Interpersonal Factors on Perceived News Media Bias. *Political Psychology* 24, 1, 101–117.

Fallis, Don. 2007. Collective Epistemic Goals. *Social Epistemology* 21, 3, 267-80.

Fredrickson, Barbara L. 2004. The Broaden-and-Build Theory of Positive Emotions. *Philosophical Transactions: Biological Sciences* 359, 1449, 1367–1377.

Friedkin, Noah E. 2004. Social Cohesion. *Annual Review of Sociology* 30, 2004, 409–425.

García-Murillo, Martha and Hala Annabi. 2002. Customer Knowledge Management. *The Journal of the Operational Research Society* 53, 8, 875–884.

Gerbner, George. 1970. Cultural Indicators: The Case of Violence in Television Drama. *Annals of the American Academy of Political and Social Science, Political Intelligence for America's Future* 388, 69–81.

Giaccardi, Chiara. 1993. Media, significato e realtà sociale: Per un approccio comparative all'analisi de testi pubblicitari. *Studi di Sociologia* 31, 3, 283–297.

Gilbert, Margaret. 1987. Modelling Collective Belief. *Synthese* 73, 1, 185–204.

Goldman, Al. 1999. *Knowledge in a Social World*. Oxford: Clarendon Press.

Goven, Joanna. 2006. Processes of Inclusion, Cultures of Calculation, Structures of Power: Scientific Citizenship and the Royal Commission on Genetic Modification. *Science, Technology, & Human Values* 31, 5, 565–598.

Habermas, Jürgen. 1984. *The Theory of Communicative Action. Reason and the Rationalization of Society. Vol. 1*. London: Heinemann.

Habermas, Jürgen. 2005. Reconciliation through the Public Use of Reason: Remarks on John Rawls's Political Liberalism. *The Journal of Philosophy* 92, 3, 109–131.

Habermas, Jürgen. 2006. Political Communication in Media Society: Does Democracy Still Enjoy an Epistemic Dimension? The Impact of Normative Theory on Empirical Research. *Communication Theory* 16, 4, 411–426.

Hamill, James. 1990. *Ethno-logic.* Urbana and Chicago: University of Illnois Press.

Hewstone, Miles. 1990. The "Ultimate Attribution Error?" A Review of the Literature on Intergroup Causal Attribution. *European Journal of Social Psychology* 20, 311–335.

Katz, Elihu, Michael Gurevitch, and Hadassah Haas. 1973. On the Use of Mass Media for Important Things. *American Sociological Review* 38, 164-81.

Kellstedt, Paul M., Sammy Zahran, and Arnold Vedlitz. 2008. Personal Efficacy, the Information Environment, and Attitudes toward Global Warming and Climate Change in the United States. *Risk Analysis* 28, 1, 113–126.

Kitcher, Philip. 2002. Veritistic Value and the Project of Social Epistemology. *Philosophy and Phenomenological Research* 64, 1, 191–198.

Kuklinski, James H. and Lee Sigelman. 1992. When Objectivity is Not Objective: Network Television News Coverage of U.S. Senators and the "Paradox of Objectivity." *The Journal of Politics* 54, 3, 810–833.

Leiserowitz, Anthony. 2006. Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery and Values. *Climatic Change* 77, 1-2, 45–72.

Mathiesen, Kay. 2007. Introduction to Special Issue of Social Epistemology on Collective Knowledge and Collective Knowers. *Social Epistemology* 21, 3, 209–216.

McLuhan, Marshall. 1994. *Understanding Media: The Extensions of Man*. Cambridge: The MIT Press.

Morgan, Michael and James Shanahan. 2010. The State of Cultivation. *Journal of Broadcasting & Electronic Media* 54, 2, 337–355.

Morton, Thomas A. and Julie M. Duck. 2001. Communication and Health Beliefs: Mass and Interpersonal Influences on Perceptions of Risk to Self and Others. *Communication Research* 28, 5, 602–626.

Morton, Thomas A., S. Alexander Haslam, Tom Postmes, and Michelle K. Ryan. 2006. We Value what Values Us: The Appeal of Identity-affirming Science. *Political Psychology* 27, 6, 823–838.

Nisbet, Matthew C. and John E. Kotcher. 2009. A Two-step Flow of Influence? Opinion-leader Campaigns on Climate Change. *Science Communication 30*, 3, 328–354.

Oppenheimer, Michael, Brian C. O'Neill, Mort Webster, and Shardul Agrawala. 2007. Climate Change: The Limits of Consensus. *Science* 317, 5844, 1505–1506.

Otten, Sabine. 2002. I Am Positive and So Are We: The Self as Determinant of Favoritism toward Novel Ingroups. In J. P. Forgas and K. D. Williams (eds.), *The Social Self: Cognitive, Interpersonal, and Intergroup Perspectives*, 273–284. New York: Psychology Press.

Potter, W. James. 1993. Cultivation Theory and Research. *Human Communication Research* 19, 4, 564–601.

Prior, Markus. 2005. News vs. Entertainment: How Increasing Media Choice Widens Gaps in Political Knowledge and Turnout. *American Journal of Political Science* 49, 3, 577–592.

Raacke, John and Jennifer Bonds-Raacke. 2008. MySpace and Facebook: Applying the Uses and Gratifications Theory to Exploring Friend-Networking Sites. *CyberPsychology and Behavior* 11, 2, 169–174.

Restivo, Sal. 1988. Modern Science as a Social Problem. *Social Problems* 35, 3, 206-225.

Roberts, Donald F. and Ulla G. Foehr. 2008. Trends in Media Use. *The Future of Children* 18, 1, 11–37.

Shapin, Steven. 1994. *A Social History of Truth*. Chigago, Illinois: University of Chigago Press.

Tajfel, Henri. 1978. *Differentiation between Social Groups: Studies in the Social Psychology of Intergroup Relations*. London, UK: Academic Press.

Tajfel, Henri. 1982. Social Psychology of Intergroup Relations. *Annual Review of Psychology 33,* 1–39. Palo Alto, CA: Annual Reviews.

Tuomela, Raimo. 1995. *The Importance of Us: A Philosophical Study of Basic Social Notions.* Stanford, CA: Stanford University Press.

Turner, John C. 2010. Towards a Cognitive Redefinition of the Social Group. In H. Tajfel (ed.), *Social Identity and Intergroup Relations*, 15–40. Cambridge: Cambridge University Press.

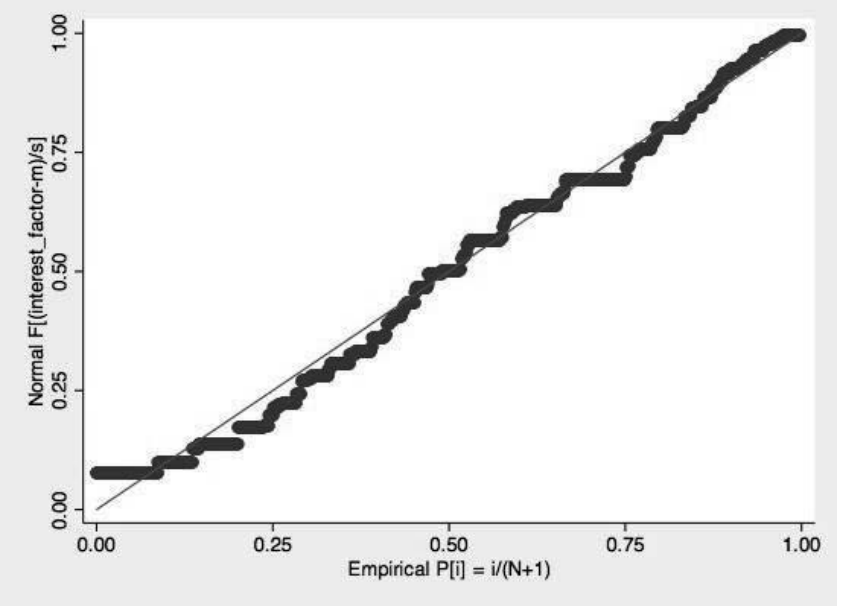
deVries, Willem. 1990. Burgeoning Skepticism. *Erkenntnis (1975-)* 33, 2, 141–164.

Vähämaa, Miika. 2013. Groups as Epistemic Communities: Social Forces and Affect as Antecedents to Knowledge. *Social Epistemology* 27, 1, 3–20.

Warren, Mark E. 1993. Can Participatory Democracy Produce Better Selves? Psychological Dimensions of Habermas's Discursive Model of Democracy. *Political Psychology 14, 2*, 209–234.

West, Mark D. 2013. Is the Internet a Public Sphere? *Journal of Mass Media Ethics* 28, 3, 155-159.

Wide, Sverre. 2009. On the Art of Being Wrong: An Essay on the Dialectic of Errors. *Journal of Philosophy of Education* 43, 4, 573–88.

Appendix 1.
Quantile-quantile Chart of Measure of Interest in Science

Congruity of empirical line to normal 0/0 line indicates normality of distribution.