

Opinion Climates, Spirals of Silence and Biotechnology: Public Opinion as a Heuristic for Scientific Decision-making

D.A. Scheufele

School of Journalism and Mass Communication and Department of Life Sciences Communication, University of Wisconsin, Madison, Wisconsin, USA; e-mail: scheufele@wisc.edu

Introduction

Levels of awareness of agricultural biotechnology as an issue on the public agenda are low, in spite of a significant amount of scientific discourse on the ethical and societal implications of this technology (Shanahan *et al.*, 2001). Similarly, levels of scientific literacy and specific knowledge about agricultural biotechnology are far from where they ideally should be. This is not particularly surprising. In fact, research in communication, political science and related disciplines has consistently shown disturbingly low levels of information among the general public about current events, politics (Delli Carpini and Keeter, 1996), and scientific issues (Miller, 1998).

The fact that citizens are uninformed about an issue such as agricultural biotechnology, however, does not mean that they will not form opinions or judgements about the issue or its policy implications, such as labelling, federal funding for research, etc. Rather, people's opinions are influenced by a range of factors *other* than information, such as ideological predispositions, the way mass media present the issue and – most importantly – their perceptions of what the climate of opinion in the country looks like.

This type of decision-making has often been labelled 'low information rationality' (Popkin, 1994), implying that it makes rational sense for citizens to collect only limited amounts of information for any given decision. In fact, given the complexity of many scientific issues, it may make perfect sense for citizens to weigh the potential risks to themselves against the efforts necessary to

understand an issue, such as agricultural biotechnology, in all its complexity. As a result, they may decide to rely on heuristic shortcuts – such as the opinions of others, rather than on scientific information.

This chapter provides an overview of opinions of others as one of the key shortcuts that people use when making decisions about agricultural biotechnology. It compares the competing influences of information and heuristic cues about public opinion. The research presented in this chapter relies on a theoretical model of opinion formation in societies called the ‘spiral of silence’ (Noelle-Neumann, 1993). Before discussing the larger theoretical model and its importance for public opinion formation about agricultural biotechnology, it is important to examine citizens’ decision-making about new technologies and the risks associated with them more carefully.

Low-information Rationality: how People Make Sense of Biotechnology

Public opinion research has struggled for decades with the question of how to systematically measure opinions of a public that is largely uninformed about scientific facts, as well as their implications for public policy (for an overview, see Page and Shapiro, 1992). Research from social psychology (Fiske and Taylor, 1991) and political science (Popkin, 1994) suggests that people are ‘cognitive misers’ or ‘satisficers’, who will only collect as much or as little information about a given issue as they think necessary to make a decision. And, in most cases, this means that they will make decisions with little, or at least insufficient, amounts of information (Kahneman, 2003).

In contrast to traditional scientific literacy models, however, which are mostly concerned with informational deficits among the general public (Bauer and Schoon, 1993; Miller, 1998), the cognitive miser model assumes that making decisions based on little or no information is not just part of human nature but may in fact make rational sense. When explaining the idea of ‘low-information rationality’ outlined earlier, Popkin (1994) argues that citizens are public consumers and invest efforts in information-seeking only if they see a reasonable pay-off.

For issues such as agricultural biotechnology, where developing an in-depth understanding would require *significant* efforts on the part of ordinary citizens, the pay-offs in terms of being able to make informed policy judgements may simply not be enough. As a result, it makes perfect sense for citizens to rely on shortcuts such as opinions of others when forming their own opinions and trying to make sense of different policy positions.

Spirals of Silence and Opinion Climates about Biotechnology

In fact, in their work on public attitudes toward agricultural biotechnology, Scheufele *et al.* (2001) suggested that many of the opinion dynamics surrounding agricultural biotechnology can be explained by a theoretical model called the ‘spiral of silence’ model. Developed by Noelle-Neumann in the early 1970s, the spiral of silence theory is one of the most prominent theoretical models of opinion formation and consensus-building about controversial issues. It assumes that people are constantly aware of the opinions of people around them and adjust their behaviours (and potentially their opinions) to majority trends with the fear of being on the losing side of a public debate.

In particular, Noelle-Neumann assumes that individuals have a ‘quasi-statistical sense’ that allows them to gauge the opinion climate in a society, i.e. the proportions of people who favour or oppose a given issue. This quasi-statistical sense may be accurate, but very often it is not, i.e. people are wrong in their assessments of what everyone else thinks. This point is largely irrelevant for the spiral of silence theory, however, since it is the *perception* of opinion distributions rather than the *real* opinion climate that shapes people’s willingness to express their opinions in public (Scheufele and Moy, 2000).

In addition to the quasi-statistical sense, Noelle-Neumann’s theory introduces a second key concept: fear of isolation. This concept is based on the assumption that social collectives threaten individuals who deviate from social norms and majority views with isolation or even ostracism. As a result, individuals are constantly fearful of isolating themselves with unpopular views or behaviour that violates social norms.

Based on these assumptions, the spiral of silence predicts that groups who see themselves in a minority, or as losing ground, are less vocal and less willing to express their opinions in public. This, in turn, will influence the visibility of majority and minority groups and the minority group will appear weaker and weaker over time, simply because its members will be more and more reluctant to express their opinions in public. Ultimately, the reluctance of members of the perceived minority to express their opinions will establish the majority opinion as the predominant view or even as a social norm.

The spiral of silence as a *process*: the public opinion dynamics surrounding agricultural biotechnology

The most critical component of the spiral of silence is also the one that has been overlooked most in previous research on the theory: its

dynamic character. The spiral of silence is a process that works over time. As people who perceive themselves to be in the minority fall silent, perceptions of opinion climates shift over time and the majority opinion is established as the predominant one or even as a social norm.

Figure 9.1 illustrates this spiralling process over time using agricultural biotechnology as a hypothetical example. During the early stages of the issue cycle, awareness of the issue and support or opposition to the new technology among the general public tend to be low. In part as a result, it is during this stage of the debate when many of the long-term opinion dynamics are established. At this stage, anti-biotech organizations are beginning to aggressively vocalize their views, even though they may be at odds with the rest of the population, which is still fairly neutral toward agricultural biotechnology. These interest groups assert their influence through lobbying, dissemination of talking points among their supporters or other activities, which are all aimed at influencing media coverage.

Ultimately, all these groups try to take advantage of the ability of mass media to do one of two things. First, mass media provide important cues about what we think the climate of opinion looks like.

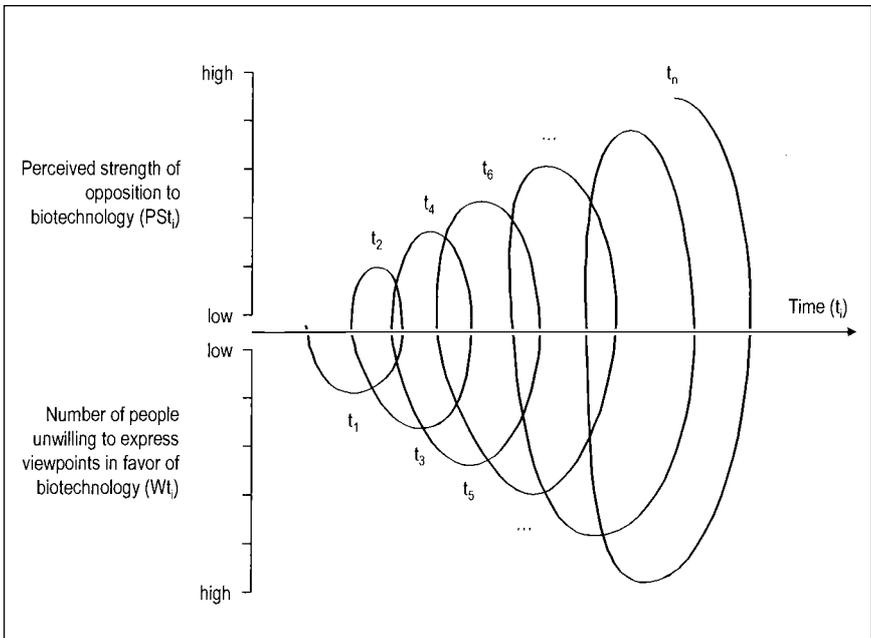


Fig. 9.1. The spiral of silence: on biotechnology as a dynamic process (based on ideas first outlined in Scheufele and Moy, 2000).

Which viewpoints are held by a majority of the population and which ones are held by a minority or are losing ground?

Second, mass media provide supporters or opponents of certain viewpoints with arguments to defend their position. Noelle-Neumann (1993) calls this the ‘articulation function of mass media’. This includes frames such as ‘Tony the Frankentiger’ that will provide easily digestible storylines for journalists when they cover these new technologies. But it also includes providing arguments in favour or against certain policy options connected to agricultural biotechnology that will be used by supporters or opponents in public discourse.

But why do these initial strategies of interest groups matter? They matter because they are directly aimed at influencing perceptions among the public about the public early on. In other words, if silent minorities are successful in shaping public perceptions of which viewpoints are in the minority or losing ground, they will also influence the long-term spiralling processes outlined in Noelle-Neumann’s theory. Figure 9.1 illustrates these processes nicely.

As more and more people think that opposition to agricultural biotechnology is a viewpoint shared by a majority of people, we will also see an increasing tendency among proponents of agricultural biotechnology to fall silent in public discussions about the issue. They will be less likely to write letters to the editor or to their congressman, they will be less likely to speak out at public meetings or dinner parties and they will be less likely to express their viewpoints in any type of public setting.

As people with minority viewpoints fall silent over time, of course, perceptions of the majority opinion gaining ground increase. This creates a mutually reinforcing spiral, where the reluctance of the minority group to speak out leads to perceptual biases in favour of the majority group which, in turn, further discourages the minority group from speaking out. The reluctance of proponents to express their views publicly will therefore play directly into the strategy of interest groups such as Greenpeace, who try to portray their view as the majority view. The more proponents of agricultural biotechnology that fall silent, the more prominent the position of Greenpeace, for instance, will appear to the general public, exacerbating the spiralling process and ultimately promoting an anti-biotech. stance as the accepted viewpoint in society.

While Fig. 9.1 provides a hypothetical overview of the spiral of silence in the case of agricultural biotechnology, Scheufele *et al.* (2001) tested some of these relationships empirically. In an experimental design they explored the factors influencing subjects’ willingness to express their opinions on genetically modified organisms in various hypothetical and real settings. Their findings

provided strong evidence in favour of a spiral of silence process. Respondents who were fearful of isolating themselves with unpopular viewpoints and respondents who saw themselves in the minority with their views on agricultural biotechnology were also significantly less likely to express their opinions in public. One interesting side note to the findings of Scheufele *et al.* was that more informed respondents were more likely to express opinions, regardless of their perceptions of a potentially hostile opinion climate.

Key actors in the spiral of silence process for biotechnology

As this brief overview shows, the spiral of silence combines social-level explanations of the opinion dynamics surrounding agricultural biotechnology with individual-level analyses of citizens' opinions and predispositions. In this sense, the theory is one of the few true macro-social theories of public opinion, i.e. it links macro-, meso- and micro-levels of analysis.

As a micro-theory, the spiral of silence examines opinion expression, controlling for people's predispositions – such as fear of isolation, and also demographic variables that have been shown to influence people's willingness to publicly express opinions on issues, such as agricultural biotechnology. In particular, previous research has shown that younger respondents and male respondents were more likely to express their views in public, regardless of fear of isolation or perceptions of the dominant climate of opinion (for an overview, see Scheufele and Moy, 2000).

Figure 9.2 lists some of these individual-level controls in the context of agricultural biotechnology. It also shows the interplay between a person's own opinions and his or her perceptions of the opinion climate on agricultural biotechnology. If the two are incongruent, the person is less likely to express his or her views. This public expression of opinion is what moves the spiral of silence to a more macroscopic level of analysis. If more and more members of the perceived minority fall silent, as outlined earlier, public perceptions of the opinion climate and the societal level begin to shift. In other words, a person's individual reluctance to express his or her opinion, simply based on perceptions of what everyone else thinks, has important implications at the social level. These social, macro-level perceptions, of course, in turn influence individual perceptions and people's willingness to express opinions.

In addition to linking macro- and micro-levels of analysis, the spiral of silence theory also implements evidence from meso-levels of analysis. In particular, social groups are also directly relevant as

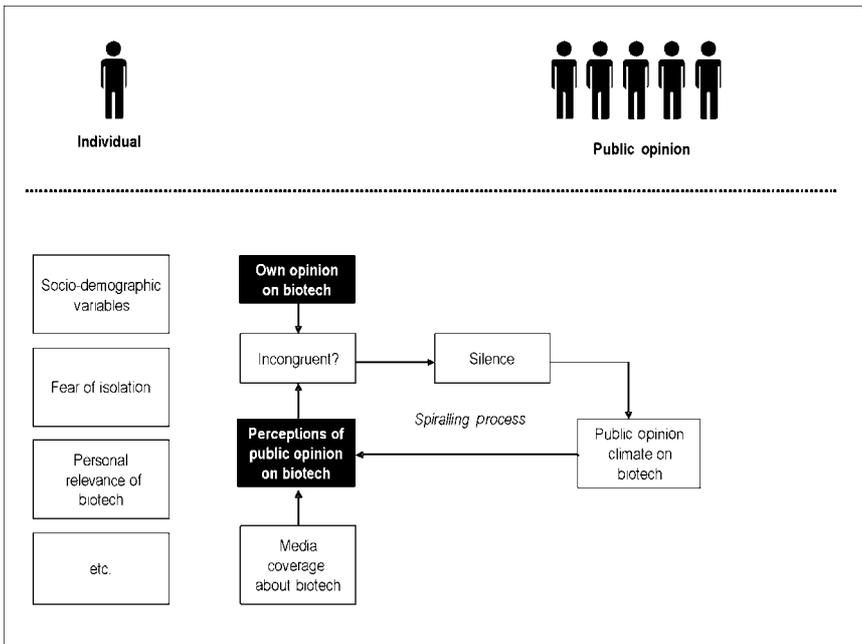


Fig. 9.2. The spiral of silence: linking individual and mass opinion on biotechnology (based on ideas first outlined in Donsbach, 1987).

explanatory mechanisms for two phenomena related to the spiral of silence. First, more recent research showed that reference groups can provide important social cues when people try to gauge the social climate of opinion. In particular, this research showed that, when trying to correctly assess the opinion distribution at the societal level, individuals often turn to experiences in their more immediate social circles or reference group as a proxy. In other words, they project from the opinion distributions they encounter in their reference groups to the climate of opinion at the societal level (Scheufele *et al.*, 2001).

The second role that reference groups can play in the process of the spiral of silence is to provide a protective environment for people who resist or choose to counter hostile opinion climates. Noelle-Neumann (1984) refers to these group as 'avant-gardes' and 'hard cores.' Hard cores are groups who stick with a minority position even as the spiral of silence grows stronger and stronger against their own position. Avant-gardes may base their resistance to hostile opinion climates on strong ideological belief systems, on a strong concern about the issue being discussed, or – most important for our discussion here – on reference groups that reinforce their existing beliefs.

While hard cores hold on to existing issue stances, even as the opinion climate turns against them, avant-gardes promote *new*, unpopular viewpoints that go against existing social norms of predominant opinion climates. As a result, reference groups probably play an important role for avant-gardes – similar to hard cores – by creating a protective social environment that provides the necessary social support for members of the avant-garde who speak out against an existing majority opinion.

Lessons for Biotechnology: when Spirals of Silence can Occur

The processes outlined in Figs 9.1 and 9.2 are, of course, idealized versions of what can take place. And, as some of the examples in this volume show, the opinion dynamics surrounding agricultural biotechnology have differed dramatically from country to country. Some of these differences can be explained by factors that have been identified as contributory conditions to the spiral of silence process. In other words, the strength of the spiralling effect depends on at least three additional variables.

The Nature of the issue

The first variable is the nature of the issue that is being discussed. Previous research suggests that the spiral of silence works especially well for issues with a moral component, or value-laden issues ‘by which the individual isolates or may isolate himself in public’ (Noelle-Neumann, 1993, p. 231).

The recent debate about embryonic stem cell research in the USA is a good example of an issue where religious and moral concerns are intertwined with more rational, scientific arguments in public discourse. Public debate of this issue is therefore morally charged and it is impossible to *objectively* answer the question of whether the USA should proceed with this new technology and provide federal funds to do so. As a result, opinion climates provide critical cues for citizens when they have to decide whether they want to express their own views in public or not.

Similarly, agricultural biotechnology may have a different degree of moral loading in different cultures. In Germany, for instance, agricultural biotechnology and genetically modified organisms may be directly at odds with the moral consensus of society. After all, Germany saw the transformation of the Green Party from an obscure splinter party in the 1980s to a member of the coalition government between the Social Democrats and the Greens (at least until the 2004

elections). It was also that particular government which endorsed concrete plans to gradually close down the country's 19 remaining nuclear power stations.

The same moral concerns that underlie public attitudes toward agricultural biotechnology in Europe, however, may not apply in Third World countries or in the USA, where some of the benefits of agricultural biotechnology or GMOs may be more directly tangible and where the electorate may not be as tuned in to environmental concerns.

Media coverage

The second factor that is important when interpreting the process of the spiral of silence is the level of media attention to the issue of agricultural biotechnology. Given that few people have direct experience with agricultural biotechnology or even direct exposure to scientists and researchers working in the field of agricultural biotechnology, media play a crucial role in providing people with the information necessary to make decisions about policy options and the potential risks and benefits connected to agricultural biotechnology. In the spiral of silence context, however, mass media also play a second important role: they allow citizens to gauge the climate of opinion around them.

In many cases this is not necessarily an undesirable outcome and, in fact, mass media can play an important function in building societal consensus. If media coverage accurately reflects the real distribution of opinions among the public, it can help establish this opinion as the predominant one and avoid long, drawn-out discussions dominated by a vocal minority. The spiral of silence theory explicitly refers to this positive aspect of the spiral of silence. As a broad majority starts to support a certain viewpoint, the remaining minority tends to fall silent, establishing the predominant view as the norm or at least as the predominant viewpoint (Noelle-Neumann, 1993).

This is critical in democratic societies, where public debate about controversial issues is largely unmoderated and could theoretically go on forever unless there are elections, legislation or court decisions that cut it short. And as, examples like *Roe vs Wade* or the federal funding guidelines for stem cell research show, even legislation and court decisions often do not resolve some of these debates.

The role of media in promoting societal consensus, however, also has its downsides. One of these downsides is often referred to as the 'dual climate of opinion'. A dual climate of opinion exists when the

majority of the population has a specific stance on an issue, but perceptions of which group is winning or losing the debate are just the opposite, and media are often the explanatory factor for these perceptual biases.

This could happen, for example, when a majority of the population supports agricultural biotechnology. A dual climate of opinion exists if there is also a prevalent perception among most citizens that a majority really opposes agricultural biotechnology. And, as outlined earlier, one explanation for this perceptual bias is mass media. If media portray agricultural biotechnology and the societal discourse surrounding it in a way that suggests that the majority of the citizens oppose research on and funding for agricultural biotechnology, we have a dual climate of opinion where collective perceptions deviate from collective preferences.

The implications for the spiral of silence are obvious. As a result of a dual climate of opinion we may see a spiral of silence against the real opinion distribution, i.e. against the majority who support agricultural biotechnology and are in favour of the opposing minority, simply because mass media inaccurately portray the opinion climate which, in turn, influences people's willingness to express their opinions and accelerates a spiralling process of the opinion climate and opinion expression against agricultural biotechnology.

In order to understand fully the idea of dual climates of opinion, it is necessary briefly to examine Noelle-Neumann's understanding of how media can shape public opinion. According to Noelle-Neumann, dual climates of opinion can develop since media coverage of controversial issues tends to be consonant and cumulative (Noelle-Neumann, 1993).

Consonance refers to the tendency of different media outlets to portray controversial issues in a consistent fashion. The idea of consonance is consistent with concepts such as inter-media agenda setting (McCombs, 2004) or news waves (Fishman, 1978), which both suggest that journalists' choices about what to cover and how to spin a story are often influenced by peer or elite media. According to Noelle-Neumann, consonant coverage of an issue therefore probably strengthens media effects since it undermines the ability of audience members to selectively expose themselves only to media messages that are consistent with their own views.

More importantly, however, Noelle-Neumann assumes that media effects are cumulative, i.e. they work *over time*. As a result, dual climates of opinion can develop when a cumulative stream of consonant media messages creates public perceptions of the opinion climate that deviate from the real opinion distribution in the population.

Cross-cultural differences

The third factor that can help predict the occurrence of spirals of silence is cross-cultural differences. In fact, Scheufele and Moy (2000) suggested that many of the inconsistencies among different studies of the spiral of silence could be explained by taking into account intercultural differences, such as differences with respect to conflict styles and norms of opinion expression. Indeed, the theory has been tested in a number of countries, including Germany, Japan, Korea and the USA.

Across studies and countries, support for the spiral of silence hypothesis varied. Some researchers have argued that these differences are a function of how Noelle-Neumann measured people's willingness to express their opinions publicly. Specifically, these researchers criticized Noelle-Neumann's (1993) use of what she called the 'train test' for being too narrow and too culturally specific.

In order to simulate a public situation and test mothers' willingness to speak out about their views on spanking their children, for example, Noelle-Neumann asked a representative sample of mothers the following question: 'Suppose you are faced with a 5-hour train ride, and there is a woman sitting in your compartment who thinks ... that spanking is part of bringing up children/that spanking is basically wrong. Would you like to talk to this woman so as to get to know her point of view better, or wouldn't you think that worth your while?' (Noelle-Neumann, 1993, pp. 17–18). The questionnaire was based on a split-ballot design, and women who opposed spanking were asked to have a discussion with a proponent of spanking and vice versa.

This train test has been criticized for being potentially culturally biased, given that long train rides and conversations with strangers in train compartments may not be realistic enough to be used in surveys in the USA or other countries. Noelle-Neumann, however, suggested a whole range of other, more indirect measures. These include displaying campaign buttons and bumper stickers, participating in public meetings or other forms of public participation (Noelle-Neumann, 1993).

Subsequent studies have often used measures of people's willingness to speak out that were less culturally specific. In their study of the spiral of silence in the context of agricultural biotechnology, Scheufele *et al.* (2001) suggested a wording that takes the public element of discussion into account and also addresses the issue of speaking out in the face of a hostile environment:

Imagine you're at a party where you don't know most people. You're talking to a group of people when somebody brings up the issue of

genetic engineering. From the discussion you can tell that most people in the group do not support your point of view. In this kind of situation, some people would express their opinions and some would not ... How likely is it that you would express your own opinion in a situation like this?

(Scheufele *et al.*, 2001, pp. 321–322)

Research suggests that, beyond the more methodological problem of finding appropriate indicators for concepts in a given culture, there is a substantial difference in personality traits for people living in different cultures. The concepts of ‘culture’ and differences between cultures, of course, are difficult to grasp conceptually and even more difficult to operationalize. Ting-Toomey (1988), however, proposed a conceptualization that is very useful in understanding why spirals of silence on issues, such as agricultural biotechnology, may be more pronounced in some cultures than in others. She suggests that the concept of individualism is a key variable in differentiating social behaviour, in general, and communicatory behaviour, specifically, across cultures.

Specifically, Ting-Toomey (1988) distinguishes between ‘individualistic, low-context cultures and collectivistic, high-context cultures’ (p. 213). Countries like Australia, Germany or the USA can be considered individualistic cultures, while Asian countries exemplify collectivistic cultures. In individualistic cultures, the consistency between private self-image and public self-image is of utmost importance, and expressing one’s own viewpoints is a virtue in itself. What other people think is of only marginal importance. It seems, however, that the idea of individualistic is limited to certain cultures. In contrast, the ‘self’ collectivistic culture is situationally based and depends heavily on the social environment of the time the social interaction takes place.

Hui and Triandis (1986) summarize what can be called the ‘collectivist personality’: ‘Collectivists are more likely to pay more attention to the influencing agent than are individualists. As a result, collectivists are more conforming than individualists ... It may be safe to say that the former are more willing to go along with the group, to avoid being rejected’ (Hui and Triandis, 1986, p. 230).

This distinction between individualism and collectivism, therefore, is highly relevant for future spiral of silence research. If it is, indeed, possible to identify personality characteristics common to citizens of a given culture, these characteristics might prove to be important long-term predictors of people’s willingness to speak out beyond more temporally bound perceptions of opinion climates.

More recent research has begun to explore these differences in greater detail. Willnat and his colleagues examined the spiral of silence

model in Singapore, using two morally charged issues: interracial marriage and equal rights for homosexuals (Willnat *et al.*, 2002). In addition to the opinion climate and fear of isolation, they also tested a host of variables that might help explain culture-specific variations of people's willingness to speak out. These variables included communication apprehension, fear of authority and social interdependence. Interdependence is especially interesting as a potential attenuating force on people's willingness to speak out. As Willnat *et al.* point out: 'people with an interdependent self-concept ... value fitting in, and regard speaking out in such circumstances as a threat to group harmony and hence inappropriate' (Willnat *et al.*, 2002, p. 394).

These cross-cultural differences, of course, have immense implications for how interest groups and policymakers in different countries think about the opinion dynamics surrounding issues such as agricultural biotechnology. In light of some of the findings on the spiral of silence in the political arena (Scheufele and Moy, 2000), the contrast between the vehement opposition to agricultural biotechnology in Europe and the much more positive and subdued reactions in the USA may very well be a function of very different processes of opinion formation. Furthermore, interest groups and mass media have probably played very different roles in the two different cultural contexts with respect to influencing opinion perceptions and perpetuating opinion spirals.

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