

Factors Affecting Judgments of Prevalence and Representation: Implications for Public Policy and Marketing

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Public policies are typically established to eliminate important social problems (e.g., minority discrimination, crime, poverty). In addition, the importance of these problems, and urgency people feel about addressing them, is influenced by perceptions of their prevalence. These perceptions, however, can be unwittingly biased by extraneous sources of information that lead some people to either overestimate or underestimate the seriousness of the problem at hand. The authors review empirical work on the construction of perceptions of frequency and representativeness and the processes that underlie them. They show that these perceptions are often biased in ways that differ over segments of the population. They conclude with a discussion of implications of these findings for developing public policy initiatives and de-biasing strategies.

Keywords: minorities, frequency estimation, advertising models, television, public policy, media issues

Legislators and other policy makers typically attempt to identify and solve problems of concern to their constituents. But what issues are deemed of sufficient importance to deserve attention? For example, how necessary is it to adopt legislation that ensures equal (proportional) representation of minorities in the media and elsewhere? How important a problem is homelessness or violent crime?

One of the more obvious determinants of a problem's importance is the frequency of its occurrence. The greater the percentage of Americans who are homeless or victims of violent crimes, the more serious the problem is perceived to be. Although the incidence of such problems can sometimes be inferred from objective data, members of the general public may often rely on their own personal experiences and knowledge. The media provide an important source of this type of information, in that television is many people's primary source of knowledge about the world in which they live (Kubey and Csikszentmihalyi 1990). However, its influence is not restricted to newscasts, documentaries, and talk shows. Rather, its effect can also be traced to the content of television programs that do not purport to reflect reality at all (e.g., dramas, soap operas, movies, situation comedies; see Russell, Schau, and Crockett 2013 [in this issue]; Shrum, Burroughs, and Rindfleisch 2005; Shrum and Lee 2012).

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However, reliance on the media can sometimes produce systematic biases in judgments, and these biases can contribute to the opinions that different segments of the population express with regard to the importance of various social policies. Although these disagreements can often be traced to self-serving motives and differences in values, they can also reflect differences in perceptions of the incidence of the situations to which the social policies are relevant. Left unchecked, these systematic biases can influence public opinion, which in turn can influence public policy.

In this article, we address the issue of biased judgments and their implications for public policy. In the first portion of the article, we discuss the nature of these differences in perceptions and explain how they arise. We assume that differences in perceptions of frequency result from differences in (1) the processing of judgment-relevant information at the time the information is first encountered, (2) the retrieval of the information at the time of judgment, and (3) the way the retrieved information is actually used to compute an estimate. In the second portion of the article, we review evidence in support of these assumptions and consider their implications for public policy.

How Frequency Judgments Are Constructed

To understand the determinants of frequency estimates, it is necessary to distinguish two processes that people might use to arrive at these estimates. First, an on-line (stimulus-based) process involves keeping a running tally of how often a type of event or situation occurs and updating the tally each time a new instance is encountered. For example, a person might determine the representation of minorities in the media by simply counting the number of minority actors

observed over some period or estimate of the extent of poverty in a community by counting the indicators of poverty (e.g., abandoned homes) relative to the indicators of affluence (e.g., luxury homes). However, such a strategy is difficult to apply, is only likely when a person has an *a priori* motivation to estimate these occurrences, and is inaccurate when a large number of experiences are encountered over a long period of time (Wyer and Srull 1989).

A second, memory-based process may be more common—though systemic biases are inherent. In particular, when people are called on to estimate the frequency of an event's occurrence, they may base their estimate on the ease with which they can recall instances of the event in question, implicitly assuming that because things that occur frequently are typically easy to recall, things that are easy to recall are likely to have occurred frequently. (For a discussion of other inferences based on the tendency to treat conditionals as biconditionals, see Wyer 2004; Wyer and Srull 1989.) This possibility, which Tversky and Kahneman (1973) first suggested, has been elaborated in an extensive program of research by Schwarz and his colleagues (Cho and Schwarz 2010; Schwarz 2004; Schwarz et al. 1991).

These findings have clear implications for frequency and representation judgments. If examples of the various constructs (e.g., poverty, crime, black models or actors) are difficult to recall, the estimates of their occurrence are likely to be relatively low. Alternatively, if examples are easy to generate from memory, frequency estimates of their incidence are likely to be relatively high. Moreover, factors that affect whether information is easy or difficult to recall become particularly important in understanding the causes of such biased judgments. Next, we discuss two particular factors that affect whether information is easy or difficult to recall, with a focus on those related to television usage.

The first factor affecting ease of recall is frequency of exposure. The more often an event has been encountered, the more representations of the event are likely to be formed and stored in memory, and therefore the more likely it is that instances of the event can later be recalled. Although this observation is almost self-evident, two additional considerations are less obvious. First, as discussed previously, frequency estimates are often not determined by the actual number of instances recalled *per se* but rather by the ease of recalling these instances. That is, frequency estimates increase with the number of instances previously experienced because the recall of any given number of instances is subjectively easier when the number available is large—not because a greater number of these instances are actually recalled at the time the estimate is made. Second, people often recall information they have received independently of its source (for a review, see Kumkale and Albarracín 2004). Therefore, the frequency with which people have been exposed to particular events—whether those events were real or depicted on television—can influence their perceptions of how often those events occur. In the policy domain, if violent crimes occur disproportionately often in television dramas, then people who watch television frequently may easily recall these instances out of context and inadvertently use them as a basis for estimating the incidence of crime in the real world. Consequently, for example, they may give stronger support than is justified to harsh anticrime policies.

The second factor affecting ease of recall is depth of processing. People are better able to remember an experience they have had if they think more extensively about it at the time the experience occurs (Craik and Lockhart 1972). Thus, the experience is likely to come to mind more quickly when they make a judgment to which that experience is potentially relevant. The thought that people devote to an experience depends on numerous factors, including its novelty (Wyer and Hartwick 1980), distinctiveness (McGuire and McGuire 1981), and inconsistency with expectations (Srull and Wyer 1989). Events that are relatively novel, distinctive, or inconsistent with expectations are likely to come to mind quickly and easily, and consequently their incidence may be overestimated (Hamilton and Gifford 1976; Sanbonmatsu, Shavitt, and Gibson 1994). These qualities of event novelty, vividness, and unexpectedness are also part and parcel of television portrayals. Thus, exposure to such events through media portrayals can influence judgments of real-world incidence independent of frequency of exposure. Table 1 summarizes the conditions under which on-line and memory-based processes are likely to be used and the nature of the two processes.

Empirical Evidence

As we indicated in the previous section, particular factors can influence estimates of the incidence of a social event through their mediating impact on the ease with which specific instances of the event come to mind. Most of the research bearing on this influence has been performed in areas of little relevance to social policy. However, two bodies of research bear more directly on policy-related questions. The first involves the effect of television viewing on perceptions of social reality. The second, which focuses on the perceptions of the incidence of minority members in advertisements, provides evidence of the distinction between on-line and memory-based processes of the sort we note here.

Television Consumption and Accessibility

Television viewing, whether it is of ads or the programs between the ads, can influence the accessibility (ease of recall) of information in memory. First, its accessibility can increase with the frequency of exposure to the information. This frequency, in turn, should be a joint function of (1) the amount of television that people watch and (2) the frequency with which construct-relevant instances are portrayed. In the latter regard, content analyses of television programs indicate that certain constructs are portrayed proportionately more often than they occur in the real world. For example, violence is much more prevalent on television than in the real world (Wilson et al. 1998). Professionals such as doctors, lawyers, and wealthy businesspeople are greatly overrepresented, as are markers of affluence (e.g., swimming pools, servants, mansions), but blue-collar and lower-status occupations are underrepresented (Lichter, Lichter, and Rothman 1994; O'Guinn and Shrum 1997; Shrum et al. 2011).

If these differences exist, they should influence the relative accessibility of television-based instances in memory

Table 1. Processes for Policy-Relevant Frequency Estimation

	Motivation to Track Event Occurrences	Activity at Event Encounter	Activity at Time of Frequency Judgment	Example
On-Line Process	High motivation: Strong a priori interest in tracking	Stimulus-based tally is kept as events are encountered.	Tally is retrieved from memory and used as a basis for the judgment.	Members of ethnic minority groups might have an a priori interest in whether they have equal representation in the media and may base frequency judgments of members of their own group on a running tally updated as exposures occur.
Memory-Based Process	Low motivation: Little a priori interest in tracking	No tally is kept as events are encountered.	Memory is searched, and ease of retrieving event instances is used as an indication of frequency on the basis of the following: <ul style="list-style-type: none"> • Frequency of exposure to real and fictional occurrences • Distinctiveness and novelty of the stimulus 	Nonminorities might have less interest in whether minorities have equal representation in the media and may need to search their memories for instances of nonminority encounters when a frequency judgment is needed.

among persons who watch television. Furthermore, if people's judgments are later based on the ease of retrieving instances from memory independently of their original context, these differences should be reflected in inferences about the frequency of the instances' occurrence in the real world. Shrum and his colleagues provide support for this proposition. In a series of studies, they demonstrate that the frequently observed positive relationship between amount of television viewing and beliefs about the incidence of such constructs as crime, marital discord, and affluence is mediated by the accessibility of those constructs in memory: television viewing increases the accessibility of the constructs, which in turn increases the estimates of real-world instances (for reviews, see Shrum 2009; Shrum and Lee 2012).

Individual Differences in Frequency Estimation

The effects of television viewing that Shrum and his colleagues identified were largely the result of memory-based processing. As we noted previously, people may sometimes make frequency estimates using on-line processing, as judgment-relevant instances are experienced. This is particularly true if people have an a priori goal to which the estimates are relevant. Briley, Shrum, and Wyer (2007) obtain indirect support for this possibility in a study of people's responses to advertisements. Both European Americans and African Americans viewed a series of clothing advertisements that showed several black and white models, and the number of black models presented was varied across conditions. Participants later estimated the number of black models they had seen and took a recognition memory test of the models. Because European American participants would likely have little reason to be concerned about the representation of black and white models in the ads, we expected they would be unlikely to think about their rela-

tive frequency at the time the ads were presented. In contrast, African American participants may be particularly concerned with their own ethnic group's representation in ads and thus might have an a priori interest in noting black versus white representation in the ads they saw, which would make them more likely to engage in on-line processing. If so, they should keep a running tally of the frequency of occurrence of these models as the models were encountered and, therefore, be fairly accurate in reporting this frequency when the number presented was small and easy to count.

The results support these conjectures. European Americans showed higher recognition of black models than African Americans did, confirming the assumption that the European American participants paid disproportionate attention to these more distinctive models. Consequently, they overestimated the incidence of black models in the ads they saw by 50%, and this overestimation was greater when the number of models presented was small (thus making the models particularly distinctive). In contrast, African American participants estimated the frequency of the black models accurately when a small number of these models were presented but underestimated their frequency when the actual number of the models they encountered was high.

Implications

The studies we have reviewed demonstrate that people's perceptions of the incidence of socially relevant events can be driven as much by their own observations—of both real and nonreal events—as by “hard data.” It seems likely that the incidence of many other events that society aims to minimize (e.g., violent crime, homelessness) or to encourage (e.g., minority college graduates, female executives) is affected similarly. People are sometimes skeptical of statistical information that bears on politically sensitive areas,

believing that the sources of the information provide data that advance their own political interests (Mosher, Miethe, and Phillips 2002). This sort of skepticism, added to people's general tendency to rely on information and arguments they have generated themselves rather than those presented by others (Petty and Cacioppo 1979), typically make personal experiences and recollections the primary determinant of the frequency judgments of social importance.

People's views on policy issues related to these events being judged are no doubt affected by certain facts or personal preferences regarding the policy area of interest, such as the objective severity of the problem at a given time (e.g., murder rate) or a person's own expectation as to what levels are tolerable or appropriate. However, the research we have reviewed suggests occasions when the underlying judgments regarding the severity of a policy-relevant problem are likely to be faulty, resulting in policy views that are misguided.

Overrepresentation in the Media: Crime Example

We have suggested that the media has a significant influence on people's development of belief systems that do not reflect reality. Although the frequency of observing a particular type of event affects perceptions of its incidence, the frequency with which the news media mentions and revisits such events can have similar effects. These effects may be an inevitable by-product of the attempt of the news to report events that are actually newsworthy and thus are novel and distinctive. However, the focus of attention on such events increases the likelihood that they are later retrieved and used as a basis for estimating the likelihood of the event's occurrence, leading to overestimates for reasons noted previously. At the same time, instances of more common phenomena (e.g., homelessness, welfare mothers' miserable living conditions) are not considered newsworthy. As a result, they appear infrequently, and their incidence is consequently underestimated.

Statistical evidence supports these contentions. For example, even though the chance of being killed at school is less than one in two million, 71% of respondents to an NBC/*Wall Street Journal* poll believed a school shooting was likely to occur in their community (American Institutes for Research 2012). Furthermore, at a time when youth crime had reached a 25-year low, 62% of respondents in the National Crime Victimization Survey that year believed it was increasing (U.S. Department of Justice 1999). According to a meta-analysis of 77 studies of newspaper and television news content, society's unrealistic fear of crime arises because the frequency of reporting violent crimes is grossly out of proportion to their actual occurrence (Dorfman 2007).

Furthermore, ethnicity-related biases in reporting exacerbate negative perceptions of blacks and Hispanics. News media often overrepresent minorities as perpetrators of crimes (Gilliam and Iyengar 2000, 2005) and are more likely to identify the race of suspects if they are black than if they are not (DeLouth and Woods 1996). Thus, reporting biases are likely to encourage the public not only to overestimate the incidence of crime but also to assign undue

blame to minority groups. Overestimates of minorities' engagement in criminal behavior could explain systemic biases in the U.S. justice system, such as the tendency for judges and juries to give harsh sentences—including the death penalty (Eberhardt et al. 2006)—to people with typically black (vs. white) features (Blair, Judd, and Chapleau 2004).

However, research also indicates that the frequency with which people observe fictitious occurrences of an event also influence frequency perceptions (Shrum 2007a, b). Frequent television viewers are likely to have a distorted view of the world, believing in a reality similar to the one that Hollywood directors have constructed in the studio—and their policy stances generally line up with this distorted perspective (Gerbner et al. 1978). People who watch a great deal of television believe that crime and violence are worse than people who watch less (Shrum 1996; Shrum and Lee 2012). Thus, frequent viewers may be more likely to fear being a crime victim, to take steps to protect against criminals (e.g., buying a handgun or alarm system), and to support aggressive government actions against crime (e.g., "three strikes" laws, hiring of additional police officers), regardless of whether viewers are themselves residents of high-crime areas.

Individual Differences: Minority Representation Example

Briley, Shrum, and Wyer's (2007) findings show that the processes by which majority group members construct their judgments can lead to the perception that the representation of minorities is greater than it actually is. In contrast, the process that minority group members employ can lead them to perceive that minorities are less well represented than they actually are. The processes we identified could account for cross-group differences in the support of affirmative action policies. For example, these processes could lead majority group members to infer that existing policies to recruit minority group members are effective when they are not, while leading minority group members to perceive that policies are not working when they are. The possibility that ethnic differences in support for equal representation initiatives derive at least in part from cognitive biases rather than animosity or self-serving motives is perhaps encouraging (for a review, see Sanbonmatsu, Shavitt, and Gibson 1994).

Our analysis is particularly relevant to higher education in United States, where affirmative action programs that achieve equal representation goals have been criticized and challenged in the courts (cf. 2012 Supreme Court hearing regarding University of Texas at Austin's undergraduate admissions). These challenges have resulted in the weakening or restructuring of affirmative action policies at state colleges in Texas in 1997, California and Washington in 1998, and Michigan and Florida in 2000. For example, the ban on considering race in admissions at the University of California, Berkeley, initially caused a 61% drop in admissions of black, Hispanic, and Native American students (Americans for a Fair Chance 2003), pushing minority groups far below proportional representation levels. The lack of public support for these programs might result in part from perceptions by majority members that the repre-

sentation of minority members in colleges and universities is greater than it actually is—perhaps due to seemingly innocuous media patterns (e.g., frequent telecasts showing black athletes participating in college sports).

Underrepresentation in the Media: Incidence of Hunger Example

Despite the immense wealth and power of America, 6.7 million households suffer from hunger (Coleman-Jensen et al. 2011). The 2008 financial crisis is responsible for having increased this number, and for pushing U.S. poverty figures to a 52-year high (DeNavas-Walt, Proctor, and Smith 2011). This important issue might be expected to receive continued and focused attention from the media, given its power to educate and shape public opinion (Kinder 1998). However, the media have not taken up this mission in earnest and may have contributed to the public's failure to view this problem as urgent and important. Several factors contribute to this failure, including the media's tendency to present the interests of the well-off as general concerns (e.g., stock portfolio performance) and downplay economic concerns of the poor (Mantsios 1995). For example, during good economic times, the news media often laud a booming economy and present a vision of widespread prosperity. This message is bolstered by fictional television programs that emphasize wealth and success (O'Guinn and Shrum 1997).

However, and of direct relevance to our discussion, the poor and their problems are not well represented in most media channels (Bullock, Wyche, and Williams 2001). In a review of studies examining the frequency of newscasts and programs focusing on hunger and other poverty issues, Bullock, Wyche, and Williams (2001, p. 232) conclude that the coverage of these issues has been "disproportionately low given the scope of the problem." The underrepresentation of hunger and related issues in television programming may have a role in American society's failure to adequately address this issue. Gandy and Baron (1998) provide evidence that this could be the case and that the hunger situation might be helped by improving coverage. They show that after exposure to in-depth media stories discussing problems faced by poor blacks, white viewers became less likely to blame these people for their economic hardships.

Identifying Those with Biases

It might be possible to identify environments in which perceptions of representativeness are particularly inaccurate, so that policy makers can understand which locales are likely to have people working from poor assumptions. For example, our analysis suggests that overestimation should be strongest in situations in which minority group members are particularly salient. Several helpful implications can be derived from this observation. First, people who run across very few members of the target minority group might be more likely to consider them distinctive and, therefore, to overestimate their incidence. For example, residents of Salt Lake City, UT, a city that is less than 2% black, could be more susceptible to making overestimates than residents of Norfolk, VA, a city that is 32% black (U.S. Bureau of the Census 2010).

The extent to which a city's neighborhoods are racially integrated is likely to be important as well. Majority members who rarely run across members of the target minority, or who encounter them only in unique situations, are more likely to find these members attention getting. If indeed a city's racial integration levels are predictive of its residents' tendencies to overestimate minority frequencies, figures reflecting city segregation can be useful to policy makers for targeting de-biasing efforts. For example, Chicago and Detroit, two of the most segregated cities according to the "isolation index" the U.S. Census Bureau uses, may need more attention from policy makers than San Jose and Portland, two of the least segregated (U.S. Bureau of the Census 2010).

Possible De-Biasing Strategies

The biases described in the preceding section are predictable, largely because the underlying processes that produce them are fairly well understood. Thus, marketers and public policy makers can predict the pattern of judgments if they know the nature of the situation and the nature of the person: how much news and television a person is exposed to, the ethnic composition of the neighborhood in which he or she lives, and so forth. However, perhaps most important for this discussion is the implication of prediction as a function of situation: marketers and public policy makers should also be able to alter aspects of the situation or person such that the biases are reduced. How might this occur? They must first make sure that people have sufficient access to objective data and, perhaps more important, are receptive to it. It is evident from decades of research on the weighting of information in judgments that people often do not weight statistical information as heavily as they weight anecdotal information, which is more vivid (Nisbett and Ross 1980). In addition, people generally weight information gained through personal experience more heavily than information gained through indirect experience in attitude construction and decision making (Fazio and Zanna 1981). Thus, the mere presentation of such information is likely to be insufficient.

To surmount high hurdles of believability and reduce inevitable distrust and counterarguing, information may need to come from or be endorsed by a credible, trusted source. In addition, the source should not be perceived to have an agenda regarding the issue at hand, given that people are generally aware that statistical information (or any information, for that matter) can be selectively presented. For example, people may be skeptical of information regarding home break-ins that comes from the National Rifle Association, or regarding minority college attendees that comes from the United Negro College Fund, because they suspect these organizations might engage in such selective presentation. For some domains, it is possible that government sources are viewed as the most unbiased. Given that different people value different sources, it would be useful to get endorsements from multiple agencies. These sorts of steps might be particularly necessary to overcome skepticism when beliefs run counter to perceptions generated from direct experience.

The attributes of decision biases that make them predictable also suggest de-biasing techniques. That is, if it is

possible to make people aware of why their perceptions may not be accurate in a particular situation, it may also be possible to help them correct for that bias. This avenue is admittedly more difficult to implement operationally and theoretically. Furthermore, even if such arguments are possible, it is often difficult to correct completely for judgmental biases no matter how persuasive the arguments (for a review, see Sherman and Corty 1984).

Conclusion

In this article, we review the research on the processes underlying the formation of perceptions of frequency and representation to show how these perceptions may be biased in predictable ways. Because these perceptions are natural and often unquestioned, they can present a challenge to policy makers who want to improve the accuracy of their constituents' judgments. Our analysis covers the role of media representations—both advertisements and the programs between the ads—on the formation of biased perceptions and offers policy implications of these biases. In the current media-rich environment, media representations often overwhelm direct experience for particular situations and groups of people (see Russell, Schau, and Crockett 2013 [in this issue]). Indeed, media representations are often the sole source of information about people and worlds distant from our own. Yet as McLeod and Chaffee (1972, p. 50) note, “our ideas seem to be peculiarly our own,... [and] it is hard for us to realize how little of our information comes from direct experience and how much of it comes only indirectly, from other people and the mass media.”

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