COMMUNICATING RISKS AND BENEFITS:
An Evidence-Based User’s Guide

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Chapter 10: Affect and Emotion
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Summary
Affect and emotion influence perceptions of likelihood, value, and the risk–benefit balance. These feelings and thoughts interact but also separately predict risk perceptions and decisions. Feelings can limit effective risk communication sometimes, but are often critical to good decision-making; their power can be harnessed in persuasive and non-persuasive communication.

Introduction
Early psychological research on risk perception and communication focused on cognitive forces that shape risk attitudes and behaviors. More recent research has developed and tested theories of risk perception that incorporate affect and emotion as key components. Within these theories, integral feelings (good and bad feelings experienced about a stimulus, e.g., prescription drugs) and incidental feelings (positive and negative feelings, such as mood states that are stimulus-independent but may be misattributed to it) are used to predict and explain how people react to risks in our complex world. The experience of mild affect and emotion is ubiquitous in everyday life. It influences the decisions of consumers, including patients, as well as the decisions of physicians, health care providers, and risk communicators. Although these feelings can have a negative impact on decision making (he was overcome with fear; she was filled with grief; both persons are incapable as decision makers). Damasio and others argue (and provide evidence) that feelings generally increase the accuracy and efficiency of the decision process, and their absence degrades decision performance. Communication efforts can be improved by understanding this descriptive research and its implications for risk communication.

What does the science say about this aspect of communication?
Two main and interrelated theoretical frameworks exist. The first concerns affect — simple, valenced, good/bad feelings — and is represented by research on the Affect Heuristic and the Risk-As-Feelings hypothesis. The second framework is the Appraisal–Tendency framework, which elaborates on cognitive–appraisal theories and examines the influence on risk perceptions of
the appraisals and behavioral motivations underlying specific emotions, such as anger and fear. The two frameworks are related in that both focus primarily on feelings experienced at the moment of judgment or choice, and valenced affect is similar to pleasantness — a primary appraisal underlying specific emotions.

**Valence and the affect heuristic.** Support for the first framework and the relationship between affective valence and risk perceptions comes from a variety of experimental, survey, and field studies. Whereas risks and benefits tend to be positively correlated in the world (e.g., risky stocks tend to offer higher return; if they don’t, they don’t last long in the market). However, risk and benefit perceptions tend to be negatively correlated (e.g., prescription drugs tend to be perceived as high benefit and low risk). This inverse relation between perceived risks and perceived benefits has been linked to the strength of positive or negative affect associated with the product or activity. People seem to use an affect heuristic and base their judgments of an activity or product not only on what they think about it but also on how they feel about it. If they feel good about an activity, they tend to judge risks as low and benefits as high; if they feel bad about it, they may judge the opposite — high risk and low benefit. Under this model, affect comes prior to and acts as information in judgments of risk and benefit (e.g., in the domain of prescription drugs).

Peters extended the Affect-Heuristic model to examine multiple ways that affect influences judgment and decision processes. For example, apart from information, affect also can act as a spotlight, causing some decision-related information to be used while other information is ignored.

Although much Affect-Heuristic evidence is correlational, experimental manipulations also exist. Research demonstrates that reliance on affect (and the negative correlation between risk and benefit perceptions) increases under time pressure. Additionally, providing one type of information (e.g., about increased risk in the absence of any benefit information) influences perceptions of the other (i.e., perceptions of benefit are reduced). Affect can also be manipulated incidentally to examine its causal impact on risk perceptions. In one paper and consistent with the Affect-Heuristic model, increasing negative affect through a mood manipulation (reading an unpleasant news story) increased risk perceptions of a variety of hazards and diseases whereas increasing positive affect in a similar manner decreased risk perceptions. Finally, effects of individual differences such as affective reactivity can also be seen on risk perceptions, with individuals higher in neuroticism and other measures of negative reactivity perceiving greater risk. Some evidence also exists that older adults and less numerate adults may perceive greater risk than those who are younger and those who are more numerate; the results presumably are due to older and less numerate populations relying more on affect (and less on deliberation) to derive their risk perceptions.
Incidental and integral sources of affect appear to influence risk reactions (and, based on Affect-Heuristic findings, likely influence benefit perceptions although this has not been studied systematically). Decision makers also appear to be insensitive to probabilities of risky events that are strongly affective. Moreover, greater risk is communicated through the use of frequency data (the number of people at risk) than through a percentage format (the percent of people at risk). The greater impact of frequencies compared to percentages appears due to focusing on and imagining the numerator (the number of people at risk) and neglecting the denominator, resulting in more affective risk-relevant images. Finally, existing data do not support the idea of a curvilinear relationship with extreme negative affect and worry inhibiting action; instead, they suggest that the more worry one has (if nonpathological), the more one is motivated to take on self-protective health behaviors.

Affect also appears to play an important role when numeric risks are compared. For example, Fagerlin, Zikmund-Fisher and Ubel found that women asked to estimate their personal risk of breast cancer over-estimated their risk (with more negative affect about cancer associated with higher risk estimates, consistent with the Affect Heuristic). In addition, after being told their actual risk (and presumably comparing it to the higher risk estimate they just produced), they reported feelings of greater relief and lesser anxiety compared to women who did not estimate their personal risk first. The authors suggest that risk perceptions “are not merely cognitive appraisals of numeric risk ... They include intuitive and emotional reactions, which translate being “high” or “low” into “something to worry about” or “something to be relieved about” (p.143).

Of course, because much Affect-Heuristic research has been conducted using self-reported affect and emotion, it is not always clear whether results are due entirely to experienced feelings or to thoughts about the product (“I feel it’s good” and “I think it’s good” can be quite similar). Effects of experimental manipulations of experienced feelings on risk perceptions, however, support the causal role of affect in risk perceptions. Research on specific emotions poses a different challenge to the Affect-Heuristic approach. As reviewed in the next section, some research suggests that emotions of the same valence (anger and fear) can have opposing effects on risk perceptions.

**Discrete-emotion research and implications for risk communication.** Public reaction to risks also can include more complex feelings such as fear and anger that go beyond valenced affect. These emotions are generally thought to be derived, in part, from feelings of goodness or badness, but they also appear to result from additional cognitive appraisals of the environment, such as predictability and coping potential. These specific emotions are generally studied as incidental emotion states (e.g., angry mood), but they can be studied as integral to (part of the representation of) an object, such as a prescription drug or FDA itself.
Some elegant work by Lerner and Keltner highlights the benefits of examining risk perceptions in an emotion-specific manner. For example, they predicted and found that fear and anger had opposite effects on risk perception. Whereas fearful people expressed pessimistic risk estimates and risk-averse choices, angry people expressed optimistic risk estimates and risk-seeking choices. Lerner, Gonzalez, Small, and Fischhoff found that an experimental manipulation of fear (writing about what makes you most fearful about terrorist attacks and then listening to a fear-inducing audio clip about bioterrorism) increased risk estimates of a future terrorist attack and plans for precautionary measures after the September 11 attack; a similar anger manipulation did the opposite.

Little evidence exists, however, for naturally occurring emotion states, whether incidental or integral, existing in such pure states for time periods long enough to exert significant emotion-specific effects; mixed emotions and mixed appraisal patterns appear to dominate. However, individuals who tend to be more angry than fearful may generally perceive less risk. In addition, emotion-specific effects may have important effects in risk communications that can convey more pure emotions. Nabi, for example, experimentally manipulated anger versus fear about drunk driving and demonstrated an impact in subsequent policy preferences for retribution versus protection, respectively. Research is needed to understand the effects of more complex mixtures of incidental and integral sources of affect and emotion on risk perceptions.

**Predictive power of feelings versus thoughts.** Research suggests that our feelings about risks are important. They can diverge from and be more predictive of behaviors and behavioral intentions than thoughts about those risks. For example, Diefenbach, Miller, and Daly found that affect (cancer-specific worry) predicted mammography adherence whereas a cognitive variable (perceived likelihood of cancer) did not. Similarly, Peters, Burraston, and Mertz demonstrated that radiation-related stigma responses (e.g., to nuclear power) emerged more from negative emotion (mixed fear and anger responses) and less from an activation of risk perceptions (of potential hazards or threats).

The power of feelings versus thoughts to influence behaviors and intentions can be altered. Experimental evidence suggests that increasing deliberation, for example, by having participants provide reasons for a choice or even doing math problems prior to a choice reduces the influence of affect in decisions. Conversely, methods exist to increase affective input into decisions by decreasing the capacity to think (e.g., time pressure and cognitive load) and by increasing affective meaning (e.g., through the use of ordering, symbols, evaluative categories and other methods to make the “gist” of information more easily accessible).
What general practical advice can the science support?

Understand what is important to know about the regulated product and know the audience for the risk/benefit communication. A descriptive understanding of the various effects that emotions and affect can have on consumer behavior related to FDA-regulated products — combined with a normative analysis of whether those effects are harmful or helpful to individual or public health concerns — can lead to development of prescriptive advice about how to harness or rein in the power of affect and emotions. For example, a case can be made for the targeted use of affect and emotion to decrease smoking through graphic warning labels on cigarette packages. In situations (e.g., statins) where long-term benefits of a medication are difficult for a patient to evaluate, but short-term costs are clear and obvious, promoting adherence might require highlighting the affective meaning of long-term benefits. Affect and emotion can be used to promote public health; they can also undermine it.

Often, however, the normative appropriateness of altering affect towards a product or towards information is unclear. Should benefit information about a medication be made easier to evaluate so that consumers use it more? Should extreme negative affect associated with the side effect of a particular medication be reduced in patient communications? The use of affect and emotion to alter behaviors and the comprehension and use of information poses serious ethical concerns. On the other hand, neglecting to consider their effects also poses ethical concerns. Understanding their effects allows policy makers to make thoughtful choices about how and what information to present rather than making such choices in random fashion, naïve to their effects.

Provide risk and benefit information about taking an action. If the Affect Heuristic is correct and providing information about increased risk (e.g., about a medication) reduces benefit perceptions (in the absence of benefit information), then FDA and others should provide information about both risks and benefits in communications.

Consider presenting risks and benefits of not taking an action. Because comparisons influence affective evaluations and thereby subsequent behaviors, a fully informed consumer should have information about what happens if she takes an action (e.g., a recommended medication) and if she does not.

Make the affective meaning of important information easy to access. Simply providing information is not enough. Research suggests that, when provided information that does not convey affective meaning, consumers are unable to use that information. The use of evaluative labels (excellent, fair), symbols (e.g., similar to Consumer Reports), or ordering can help consumers to access the meaning of important information and thereby use it in place of less relevant sources of information. Use of these techniques can also facilitate the integration of important information.\(^4^9\)
When emotions are expected to be high (and potentially harm decisions), provide methods to “stop and think” to reduce affective input. Consumers and patients sometimes react with fear, alarm, anger, or dread in ways that can overwhelm their ability to understand and use risk communications and make effective decisions. In cases where FDA or others can predict this may happen, encouraging the patient or consumer to stop and think (including to think and try to better understand their own emotional reactions) may help to reduce strong reactions so that, for example, a patient can weigh pros and cons of treatment options.

Fight fire with fire. In cases where FDA believes that persuasive communication is the best approach, emotional communications, especially those that are fear-based, can be used to increase risk perceptions and change behaviors. An example of this might be requiring the use of particularly graphic warning labels on cigarette packages.

Consider the effects of advertising, brand names, and other promotional efforts on perceptions of the risks and benefits of products that FDA regulates. Work on the affect-heuristic and risk-as-feelings hypotheses have demonstrated that incidental sources of positive and negative affect, respectively, can reduce and increase risk perceptions. Promotional efforts intended to increase sales often do so by conveying positive affect; they show happy, successful patients, not those who are suffering. As a result, these promotional efforts (even in the absence of any information about benefits) likely increase perceptions of those benefits and decrease perceptions of risks. Their effects, however, are less clear and predictable given the preponderance of side-effect information generally required in FDA-regulated advertisements; this topic deserves further study.

How does one evaluate communications implementing this advice?

Evidence collected across a wide variety of domains, using diverse experimental and survey methods, highlight the potential importance of affective processes in how consumers and patients process and use information related to FDA-regulated products. The scientific study of affect and emotion in risk perception and decision making is relatively new, however, and differences exist across situations with respect to the nature of emotional sources of information (e.g., whether integral or incidental, specific to fear and worry or involving depression) and of the normative appropriateness of emotional experience (and the many situations where the normative appropriateness is unclear). This combination suggests that communications should be tested for their impact on affect and emotions, thoughts, risk and benefit perceptions, and, ultimately, health behaviors prior to their use. Such research should be conducted in appropriate populations and particularly in vulnerable populations who are likely to or should be affected by the communication.
Affect and emotions can be measured in a variety of ways, including simple self-report measures\(^{16}\) (“How do you feel about it?” on scales that range from good to bad or not at all angry to very angry). Pictorial scales\(^{44}\) may provide a particularly accessible method to measure affect in less literate populations. Less reportable affect can be measured using reaction times and physiological measures (e.g., heart rate or skin conductance responses). Individual differences in affective reactivity and experimental manipulations of affect or particular emotions can also be employed (See Peters\(^{12}\) for a brief review).

Without any budget for testing communications, FDA can nonetheless ask its internal experts to prioritize information from most to least important and highlight the affective meaning of the most important information. The agency can develop communications that present both risk and benefit information, including comparative risks and benefits of not taking an action. FDA can conduct semi-structured cognitive interviews with employees (particularly those with less education and experience in risk communication) who evaluate and comment on the message. Is the message clear? Is there anything that is not understood? If FDA knows from internal conversations that previous messages have “missed the mark” in some way (e.g., comprehension of a particular aspect of an important message), targeted questions can be asked. Risk communication experts, with knowledge about the role of affect and emotion, should be included early on in discussions about possible regulatory approval of products to maximize the potential for strategic risk communication.

With a modest budget, the methods above can be used to refine a specific communication before conducting one-on-one cognitive interviews with individuals who read and evaluate FDA’s message. Testing of message comprehension is critical, and it is particularly important to include people with less education and lower levels of numeracy and literacy. This testing should include comparative testing with previous messages (or alternative message forms that emerged in earlier testing) in order to examine how the communication alters feelings and perceptions of risks and benefits of the disease and possible treatments. If FDA has a particular message that decision analysis has revealed as important, does the communication successfully convey the message?

A serious budget for the testing of risk communications would allow FDA to take a more refined approach to testing specific messages, and also to fund and/or conduct research to uncover the general mechanisms underlying how consumers and patients process and use information that FDA provides or regulates. For specific messages, semi-structured interviews can be used to refine different versions of the message and then a nationally representative test of the messages can be conducted to maximize comprehension and use of information highlighted by the normative analysis of the particular situation. It
could allow for a randomized controlled trial of that specific communication in the specific segment of the population that will most likely use the product and to test the messages in relevant vulnerable patient populations.

Testing could also be more systematic and uncover general underlying mechanisms to guide FDA in future risk communications across a range of products and situations. Systematic research across different FDA-regulated products could reveal, for example, how and when direct-to-consumer advertising influences benefit and risk perceptions. Systematically varying the information-presentation format (e.g., percentages vs. frequencies) with which benefits and/or risks of prescription drugs are presented across different types of drugs and devices could assist FDA in predicting what formats will work best to facilitate comprehension and use of information and in what kinds of situations. Such systematic studies could have impact within and beyond FDA. It is through such systematic studies that a general theoretical framework of effective risk communication will ultimately emerge.

Additional resources


3. Lerner, J. S., and Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology, 81*(1), 146-59. Drawing on an appraisal-tendency framework, the authors found that fear and anger have opposite effects on risk perception with fearful people being risk averse and angry people being risk seeking.


6. Kees, J., Burton, S., Andrews, C., and Kozup, J. (in press). Understanding how graphic pictorial warnings work on cigarette packing. *Journal of Public Policy and Marketing*. The authors hypothesized and found that more graphic pictorial warning depictions strengthen smokers’ intentions to quit smoking and that this effect was mediated by fear.

7. Hibbard, J.H. and Peters, E. (2003). Supporting informed consumer health care choices: Data presentation approaches that facilitate the use of information in choice. *Annual Review of Public Health, 24*, 413-433. This paper reviews barriers to effective consumer use of information in choice as well as evidence for the efficacy of different presentation strategies to propose an initial framework concerning how to present information to support consumer choice.

9. Zikmund-Fisher, B.J., Fagerlin, A. and Ubel, P.A. (2010). Risky feelings: Why a 6% risk of cancer does not always feel like 6%. *Patient Education and Counseling, 81*(Suppl. 1), S87-S93. The authors review evidence that emotions are often more influential in health decision making (particularly due to risk comparisons) than is factual knowledge.

**Endnotes**


