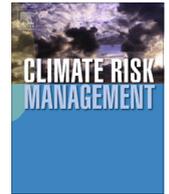




ELSEVIER

Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

Climate Risk Management

journal homepage: www.elsevier.com/locate/crm

Resilience vs. Adaptation: Framing and action


 Gabrielle Wong-Parodi^{a,*}, Baruch Fischhoff^{a,b}, Benjamin Strauss^c
^a Department of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh, PA 15213, USA

^b Department of Social and Decision Sciences, Carnegie Mellon University, Pittsburgh, PA 15213, USA

^c Climate Central, Princeton, NJ 08542, USA

ARTICLE INFO

Article history:

Available online 23 July 2015

Keywords:

 Climate change
 Framing effects
 Decision-making
 Resilience
 Adaptation
 Motivation

ABSTRACT

Responses to climate change may be viewed as requiring primarily “Resilience” or “Adaptation.” We examine how those two terms affect lay responses to the risks of coastal flooding and sea level rise. We use two tasks requiring substantial participant involvement, one providing minimal information and one substantial information. In Study 1, participants spent ten minutes writing an essay about a picture with flooding, labeled with “Resilience” or “Adaptation.” In Study 2, participants used an interactive aid to evaluate moving to a coastal community described as having a policy of Resilience or Adaptation, or having No Stated Policy. In Study 1, both groups judged the threat of flood similarly. In Study 2, Resilience was associated with increased concern about risks, but less willingness to take individual protective action.

© 2015 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Resilience vs. Adaptation

The terms “Resilience” and “Adaptation” compete as ways to frame discussions about meeting the challenge of climate change (Adger et al., 2005; Brown, 2013; Dietz et al., 2009; McEvoy et al., 2013; Nelson et al., 2007). As discussed below, scientific usage of the two terms suggests rather different forms of mobilization. Here we ask how the choice of term affects lay responses to the risks of coastal flooding, as expressed in two tasks, one with minimal content and one with detailed (informational) content.

The psychological concept of Resilience has its roots in child development research (Antonovsky et al., 1971; Hill, 1958; Werner, 1993). Scientists wondered why some people who experience multiple stressors still grow into healthy adults (Masten, 2001). Their studies identified supportive factors in both individuals (e.g., talent, physical health) and their environments (e.g., help from extended families or mentors). Psychological studies of Adaptation ask how people respond to stressors, without presuming that they master the challenges (Lazarus and Folkman, 1984). Many accounts are variants of Adaptation Level Theory (Helson, 1948), according to which people come to treat new situations as the norm, even when that means accepting a diminished state. For example, Cognitive Adaptation Theory (Taylor, 1983) examines how people find meaning in trauma; Interpersonal Adaptation Theory (Burgoon et al., 2007) considers how they adapt to new social settings.

Thus, for psychologists, “Resilience” is a trait, reflecting a general ability to master challenges, whereas “Adaptation” is a state, reflecting how individuals deal with specific stressors. Resilience includes the ability to acquire new capabilities, perhaps emerging stronger from the struggle, whereas Adaptation entails preserving existing resources. If these terms evoke the

* Corresponding author at: Department of Engineering and Public Policy, 129 Baker Hall, Carnegie Mellon University, Pittsburgh, PA 15213. Tel.: +1 510 3161631.

E-mail address: gwongpar@cmu.edu (G. Wong-Parodi).

same perspectives for lay audiences as they do for scientists, then they might evoke different responses to the threat of climate change – just as “climate change” and “global warming” might (Leiserowitz and Feinberg, 2014). If so, then the choice between them would add another example to the literature on framing or context effects, which arise from seemingly subtle changes in how problems are posed (Chong and Druckman, 2007; Levin et al., 1998; Tversky and Kahneman, 1981; Scheufele and Iyengar, 2014).

Here, we assess how the choice between these two terms affects responses to the threat of coastal flooding. Study 1 has participants write an essay about a flood cleanup scene labeled with a single word, “Resilience” or “Adaptation,” and then answer questions about how they would respond to flooding risks. Study 2 has participants use a decision aid to evaluate moving to a community vulnerable to coastal flooding, described as having a policy of Resilience or Adaptation, or having No Stated Policy, and then answer questions about flooding risks. Both tasks, writing an essay and exploring a decision aid, are more involving than those in the typical framing study, although still reflecting hypothetical choices.

Study 1 – framing in a word for current risk

Participants wrote stories about a flood cleanup scene after being randomly assigned to conditions in which it was labeled with “Resilience” or “Adaptation,” in order to evoke its natural associations. They then answered questions about how they would respond to coastal flooding risks if they lived in the place depicted in the picture.

Participants

We recruited 202 adult participants through Amazon’s Mechanical Turk (MTurk), an online service (Buhrmester et al., 2011). Comparisons of behavioral experiments using MTurk and other recruitment methods, such as participant pools or convenience samples, have found few differences (Crump et al., 2013; Mason and Suri, 2012). In self-reports, participants’ mean age was 34.4 ($SD = 12.5$), with 59.9% female, 78.8% White or Caucasian, 46.1% with at least a bachelor’s degree, and 36.7% with household income \geq \$51 K. 37.1% were Democrats, 36.6% Independents, 16.8% Republicans, and 9.5% Other or Prefer not to answer.

Methods

Study 1 experimental procedures

After a brief introduction, informed consent, and screening for age (≥ 18), participants were randomly assigned to the Resilience or Adaptation condition. All saw the same picture of a man standing in water, stooping to clear debris from a storm drain (Fig. 1), with the word “Resilience” or “Adaptation” superimposed on it. Following Pennebaker et al. (2007), participants were asked to write a complete “imaginative” story about the scene in the picture, describing who the man might be, what led to his situation, and how things will turn out. They were asked to write continuously for at least 10 min, with a timer showing how long they had been working on the essay. After writing, they answered questions regarding their concern about coastal flooding, motivation to prepare for those risks, and demographics.

Study 1 measures

Scenarios. We used the Linguistic Inquiry and Word Count tool (LIWC) (Pennebaker et al., 2007) to evaluate participants’ narratives. It measures properties of written speech, including linguistic (e.g., pronouns, verbs, tense, numbers), psychological (e.g., social, affective), personal (e.g., work, money), and speech categories (e.g., assent, non-fluency).

Concern about flooding risk. (a) *Flood expectations:* Participants used a drop-down menu, with interval response options from 0 ft to 10+ ft, to indicate “the highest level that you would expect to see in the place shown in the picture between today and 2050”. (b) *Flood tolerance:* Participants used the same drop-down menu to indicate “the highest level that you would expect to see between today and 2050 that most people would be willing to live with, before deciding not to move to the place in the picture”. (c) *Flood insurance:* Participants indicated their agreement with the statement: “I would purchase flood insurance if I moved to the place shown in the picture,” with 1 = completely disagree, 7 = completely agree.

Motivation to prepare for flooding risks. Participants were asked to “Imagine that you and your family moved to the place shown in the picture.” They then rated their agreement (1 = completely disagree, 7 = completely agree) with statements positing four actions as things (d) that they could do to prepare against the risk of flooding, (e) that they would do, and (f) that would help to protect their families. The actions were (1) “sealing the edges of my basement walls,” (2) “making a family emergency plan,” (3) “voting for local candidates who support ending subsidies to live in flood-risk areas” and (4) “voting for local candidates who support stronger ‘flood-proofing’ building codes”.



Fig. 1. Study 1 stimuli (Allison Joyce/Getty Images).

Results

Flooding essays

The Resilience and Adaptation essays were equally long, with mean word counts of 259.7 (*Median* = 264, *SD* = 91.8) and 279.1 (*Median* = 291, *SD* = 81.1), respectively. We compared them on 68 psycholinguistic markers scored by the Linguistic Inquiry and Word Count tool (Pennebaker et al., 2007), finding only four significant differences ($.01 < p < .05$), about the number expected by chance. Compared to the Adaptation essays, Resilience essays more often mentioned family (e.g., brother, children) and used inclusion words (e.g., and, between), and less often referenced time (e.g., until, end) and used adverbs (e.g., slowly, quickly). Although these differences must be treated cautiously, the psychological concept of Resilience does emphasize social ties as integral to healthy coping (Antonovsky et al., 1971; Hill, 1958; Masten, 2001; Werner, 1993).

Concern about flooding

One-way Analysis of Variance (ANOVA) found no differences on the three measures of concern (Table 1, rows a–c). Comparing rows a and b, participants in both conditions expected floods about 1.5 ft higher than the level that they considered tolerable. They also expressed a strong predisposition to purchase flood insurance (row c) if they lived in the depicted place.

Motivation to prepare for flooding

Participants evaluated four protective actions as ones that (d) “I could do,” (e) “I would actually do,” and (f) “Would help protect my family.” Individuals evaluated them similarly in these three contexts, with Cronbach’s alphas of 0.70, 0.70, and 0.64, respectively. Pooling the ratings for each context revealed no differences between the Resilience and Adaptation conditions (Table 1, rows d–f).

Discussion

The Resilience and Adaptation frames produced generally similar essays, ratings of concern about coastal flooding, and willingness to prepare, with a suggestion that Resilience evoked more sense of social connection (with more family references and inclusive words). One possible explanation of the lack of a framing effect is that thinking about a flood that had already happened focused participants on adapting to a specific event, while diverting their attention from thinking about preparing for possible future challenges (Bubeck et al., 2012; Poussin et al., 2014). If so, then “Resilience” may have been interpreted as bouncing back from that one event – in effect, Adaptation. A second possible explanation is that, despite having a demanding task (writing for at least 10 min), Study 1 presented too little substantive context to engage the planning needed for Resilience. Study 2 presents a more substantive, information-rich task. In it, participants use an interactive aid to consider moving to a coastal community vulnerable to flooding, with a policy described as Resilience or Adaptation, or with No Stated Policy.

Study 2 – framing in a program

Participants used an interactive decision aid to evaluate moving to the fictional coastal community of Seaside after random assignment to conditions describing it as having a policy of Resilience or Adaptation, or with No Stated Policy. They then answered the same questions as Study 1.

Table 1

Study 1 and Study 2 results for one-way ANOVA for concern about flooding risk and motivation for preparing for flooding risks.

Question	Condition	Study 1			Study 2		
		M	SD	One-way ANOVA	M	SD	One-way ANOVA
(a) Highest flood height expected ¹	Resilience	6.23	3.05	$F(1, 200) = 1.57, p = .21$	7.80	2.46	$F(2, 202) = 41.53, p < .001$
	Adaptation	5.71	2.90		3.49 ^a	2.62	
	No Stated Policy	–	–		3.35 ^a	3.56	
(b) Tolerable flood height ¹	Resilience	4.82	2.94	$F(1, 200) = 2.53, p = .11$	5.46 ^a	2.66	$F(2, 202) = 17.31, p < .001$
	Adaptation	4.20	2.54		5.51 ^a	2.88	
	No Stated Policy	–	–		2.91	3.30	
(c) Intention to purchase insurance ²	Resilience	5.37	1.63	$F(1, 200) = .00, p = .98^*$	6.64	.75	$F(2, 202) = 1.44, p = .24^*$
	Adaptation	5.37	1.73		6.46	1.20	
	No Stated Policy	–	–		6.74	.86	
(d) Action could do ²	Resilience	5.90	1.03	$F(1, 200) = 2.45, p = .12$	5.84	.80	$F(2, 98) = .64, p = .53$
	Adaptation	6.10	.85		6.02	1.78	
	No Stated Policy	–	–		6.08	.72	
(e) Action would do ²	Resilience	5.32	1.15	$F(1, 200) = .03, p = .87$	3.57	.85	$F(2, 98) = 33.23, p < .001$
	Adaptation	5.30	1.24		5.64 ^a	1.35	
	No Stated Policy	–	–		5.87 ^a	.70	
(f) Action helpful to do ²	Resilience	5.53	1.03	$F(1, 200) = .00, p = .96$	3.61	.44	$F(2, 98) = 55.53, p < .001$
	Adaptation	5.53	.97		5.48 ^a	1.15	
	No Stated Policy	–	–		5.65 ^a	.92	

Note: Where one-way ANOVA shows an overall group difference, shared superscripts indicate groups that were not significantly different from one another.

¹ Response scale is from 1 to 10+ feet.

² Response scale is from 1 = completely disagree to 7 = completely agree.

* Significantly higher than mid-point (4) with $p < .001$.

Participants

We used Amazon's Mechanical Turk to recruit a new set of 206 adult participants, different from those in Study 1. Their mean self-reported age was 33.2 ($SD = 10.8$), with 40.5% female, 73.5% White or Caucasian, 44.8% with at least a bachelor's degree, and 36.8% with household income \geq \$51 K. 43.9% were Democrats, 37.6%, Independents, 12.2% Republicans and 6.4% Other or Prefer not to answer.

Methods

Study 2 experimental procedures

After a brief introduction, informed consent, and screening for age (≥ 18), participants were randomly assigned to the Resilience, Adaptation, or No Stated Policy condition. All were told to imagine possibly moving with their family to the fictitious "typical coastal town" of "Seaside," where they "want to settle down, with no plans to move ever again." They were told that their family is concerned about coastal flooding, and wants them to find out more about it. They then answered the open-ended question, "How do you think that your family might use information about coastal flooding?"

Participants in the No Stated Policy condition then completed the measures, whereas those in the Resilience and Adaptation conditions were taken to the City of Seaside "website" whose welcoming screen read:

Seaside and its citizens are investing in increasing their [resilience/ability to adapt] in the face of coastal flooding risks. One of our programs helps Seaside [become more resilient/adapt] by helping families make emergency plans. Another program provides no-interest loans for flood-proofing homes. Your family can feel good about [Resilient/Adapt] Seaside.

"Resilient Seaside" or "Adapt Seaside" appeared in the top right corner of all subsequent screens.

Participants then used a mock-up of the Surging Seas "Risk Finder" tool (Fig. 2) (<http://sealevel.climatecentral.org>). It allowed them to manipulate flood height between 1 and 10 feet, and see projections for Seaside of the corresponding (i) chances of such a flood between today and 2050, (ii) map of land under the selected flood height, (iii) percentage of land below the flood height, and (iv) percentage of people, schools, homes, road miles, power plants, and sewage plants below the flood height (Strauss et al., 2012; Tebaldi et al., 2012). They were asked to "explore the tool" until they had enough information to tell their families about coastal flooding in Seaside. They were told that they would be asked questions about what they learned and to take as much time as needed. The details of the display for Seaside, an imaginary place, were modeled after those for actual cities.

Study 2 measures

Participants answered the same questions as in Study 1.

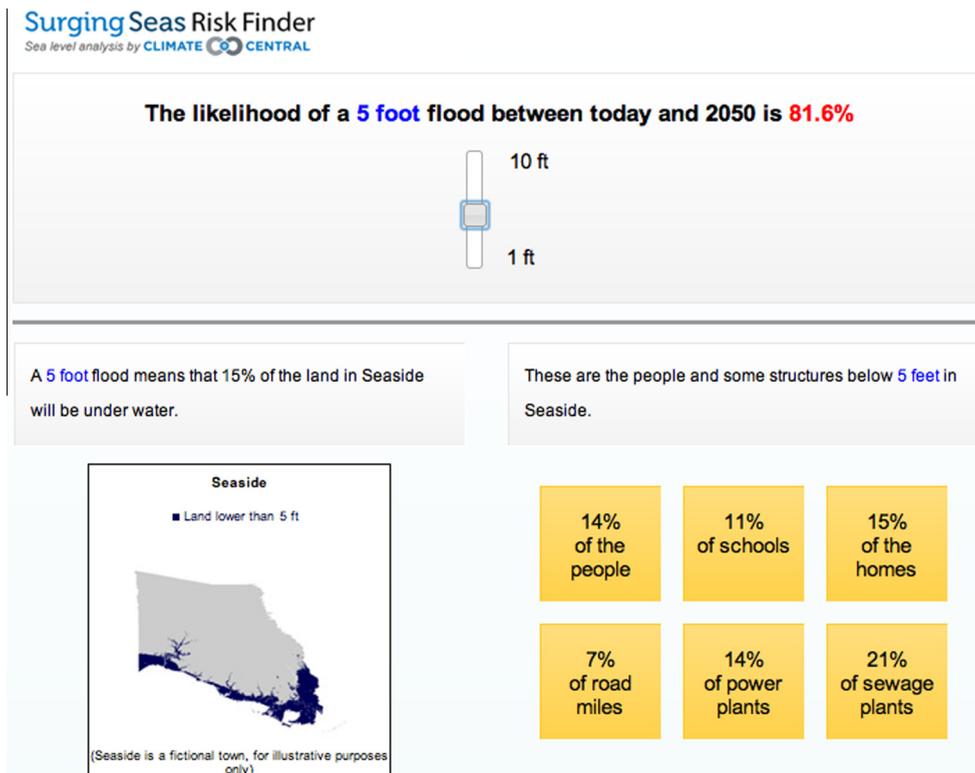


Fig. 2. The Risk Finder decision aid.

Results

Concern about flooding

As seen in Table 1, one-way ANOVA and pair-wise contrasts found that (a) Resilience evoked significantly higher expected flood heights than did Adaptation and No Policy Stated, (b) both Resilience and Adaptation evoked significantly greater tolerance for flood height (before deciding not to move to Seaside) than did No Stated Policy, and (c) all three conditions evoked similar intentions to purchase flood insurance (which was higher than that in Study 1). Resilience participants expected floods more than 2 ft higher than what they considered tolerable (comparing rows a and b), whereas Adaptation participants expected floods about 2 ft lower than what they considered tolerable, and No Stated Policy participants expected just-tolerable heights.

Motivation to prepare for flooding

As in Study 1, participants evaluated the four protective actions similarly in each of the three contexts, with Cronbach's alphas of 0.64, 0.63, and 0.66, for things that (d) "I could do," (e) "I would actually do," and (f) "Would help protect my family," respectively. As seen in Table 1, the three groups rated the actions similarly as things that they could do (d). However, Resilience participants reported being less likely to do them (e) and seeing them as less helpful (f), compared to Adaptation and No Stated Policy participants (and those in Study 1).¹

Discussion

Study 2 made the frame more relevant to participants, by having them use an interactive aid to evaluate a hypothetical move to a coastal community with a policy of Resilience or Adaptation, or with No Stated Policy. Resilience evoked greater

¹ There were several weak demographic trends. Participants who reported having more education tended to see the preparation actions as being less effective. That result that reached statistical significance for the Adaptation and Resilience groups in Study 1 ($p < .05$) and was in the same direction for the groups in Study 2. Participants who reported higher levels were also less willing to take such actions, a result that reached statistical significance only for the Adaptation group in Study 1. Women in Study 1 were more likely to report that they could do, would do, and saw the preparation actions as effective than were men, patterns that reached statistical significance in Study 1 ($p < .05$). Self-identified Democrats were more likely to report being able to take the various actions than were other participants, a result that reached statistical significance only in Study 1 ($p < .05$). We found no statistically significant correlations ($\alpha = .05$) between any of the demographic variables and any of the measures of concern about flooding risk.

reported concern about flooding risks than did Adaptation or No Stated Policy, but also less reported willingness to prepare and less faith in preparatory actions.

General discussion

People can seek to adapt to the damage caused by climate change or to be resilient in the face of the threat. We examined the impact of invoking these two ways of framing the challenge in two ways. Study 1 had participants spend ten minutes writing an essay about a flood scene, with no words other than the label Adaptation or Resilience continuously present, and then answer structured questions about the threat (e.g., predicted and tolerable levels of sea level rise, effectiveness of possible responses). Study 2 had participants use an interactive aid to inform a hypothetical decision about moving to a coastal community, described as having a policy of Resilience, Adaptation, or No Stated Policy. They then answered the same structured questions. The essay writing and interactive aid tasks were designed to be equally engaging, with the latter providing an explicit decision context (moving to Seaside) and the former providing none.

In Study 1, participants responded similarly to the two frames, with some suggestion that Resilience evokes stronger social ties, consistent with its usage in psychology. In Study 2, however, participants in the Resilience condition expected greater flooding and saw the proposed protective actions as less effective, compared to those told that Seaside had a policy of Adaptation or No Stated Policy (with those two conditions producing similar ratings of the risks and protective actions). Participants told that Seaside had either a policy of Resilience or Adaptation reported tolerating greater flooding (before deciding not to move), compared to those for whom Seaside has No Stated Policy. Resilience participants saw the risk as above the tolerated level, whereas Adaptation saw it as below.

Thus, with a task requiring a specific (albeit hypothetical) decision (Study 2), rather than just sustained reflection on a past calamity (Study 1), “Resilience” may signal large, unmanageable risks, whereas “Adaptation” signals smaller, more manageable ones. Indeed, participants in the Resilience condition saw all four actions as less helpful than did those in the Adaptation or No Policy Stated conditions (or participants in either the Resilience and the Adaptation conditions in Study 1, with its less specific task). The actions were rated as similarly doable in all conditions.

Based on these results, reference to any specific policy appears to increase sensitivity to flood risks, compared to when no policy is stated. However that response depends on the policy. Adaptation appears to make flooding risks seem more manageable and individual preparatory action as more worthwhile (Hay et al., 2005), whereas Resilience appears to raise concerns, to the point of making individual actions appear less useful. Further research is needed to tell whether community-level Resilience actions would address those concerns (Schwartz, 1994; Schwartz and Bilsky, 1987; Walton et al., 2012). These results are consistent with the frequent finding that concern undermines action, unless accompanied by plausible plans (Hay et al., 2005). The four actions offered here may seem adequate when thinking about one flood in general terms (Study 1), but not when considering future flooding risks relevant to a specific decision (Study 2).

Thus, Study 1 suggests that Adaptation and Resilience are equivalent frames when people think about past events, whereas Study 2 suggests that the frame matters when people think about a stream of future risks. There, “Resilience” appears to evoke a more cautious attitude regarding the effectiveness of individual actions, whereas a policy of “Adaptation” may suggest that the risks are manageable. For stakeholders, such as emergency managers, interested in motivating action to meet the challenge of climate change, these results indicate the value of engaging people in specific decisions, supported by relevant information (Fischhoff, 2013; Pidgeon and Fischhoff, 2011; Wong-Parodi and Fischhoff, 2015). Moreover, invoking a policy of Resilience or Adaptation is better than stating no policy at all. However, Adaptation appears better for motivating individual action. Whether invoking Resilience will do more to motivate community action is a matter for further research.

Author contributions

All authors contributed to the conception and the design of these experiments. G.W.P. ran the experiment and analyzed the data. G.W.P. and B.F. led the writing of the paper, with input from B.S.

Competing financial interests

The authors declare no competing financial interests.

Acknowledgements

This work was supported by research Grants from the Rockefeller Foundation and the Center for Climate and Energy Decision Making (SES-0949710). The authors also thank Jack Wang and Dan Rizza for their support with the experiment. The views expressed are those of the authors.

References

- Adger, W.N., Hughes, T.P., Folke, C., Carpenter, S.R., Rockström, J., 2005. Social–ecological resilience to coastal disasters. *Science* 309 (5737), 1036–1039.
- Antonovsky, A., Dowty, N., Maoz, B., Wijzenbeek, H., 1971. Twenty-five years later: a limited study of sequelae of the concentration camp experience. *Social Psychiatry* 6, 186–193.
- Brown, K., 2013. Global environmental change IA social turn for resilience? *Prog. Hum. Geogr.*
- Bubeck, P., Botzen, W.J., Aerts, J.C., 2012. A review of risk perceptions and other factors that influence flood mitigation behavior. *Risk Anal.* 32 (9), 1481–1495.
- Buhrmester, M., Kwang, T., Gosling, S.D., 2011. Amazon's mechanical turk a new source of inexpensive, yet high-quality, data? *Perspect. Psychol. Sci.* 6 (1), 3–5.
- Burgoon, J.K., Stern, L.A., Dillman, L., 2007. *Interpersonal Adaptation: Dyadic Interaction Patterns*. Cambridge University Press.
- Chong, D., Druckman, J.N., 2007. Framing theory. *Annu. Rev. Political Sci.* 10, 103–126.
- Crump, M.J., McDonnell, J.V., Gureckis, T.M., 2013. Evaluating Amazon's Mechanical Turk as a tool for experimental behavioral research. *PLoS One* 8 (3), e57410.
- Dietz, T., Gardner, G.T., Gilligan, J., Stern, P.C., Vandenbergh, M.P., 2009. Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proc. Natl. Acad. Sci.* 106 (44), 18452–18456.
- Fischhoff, B., 2013. The sciences of science communication. *Proc. Natl. Acad. Sci.* 110 (Suppl. 3), 14033–14039.
- Hay, J.L., Buckley, T.R., Ostroff, J.S., 2005. The role of cancer worry in cancer screening: a theoretical and empirical review of the literature. *Psycho-Oncology* 14 (7), 517–534.
- Helson, H., 1948. Adaptation-level as a basis for a quantitative theory of frames of reference. *Psychol. Rev.* 55 (6), 297.
- Hill, R., 1958. Generic features of families under stress. *Social Casework* 49, 139–150.
- Lazarus, R.S., Folkman, S., 1984. *Stress, Appraisal, and Coping*. Springer Publishing Company.
- Maibach, E., 2014. *What's in a name? Global Warming vs. Climate Change*. Yale University and George Mason University. New Haven, CT: Yale Project on Climate Change Communication.
- Levin, I.P., Schneider, S.L., Gaeth, G.J., 1998. All frames are not created equal: a typology and critical analysis of framing effects. *Organ. Behav. Hum. Decis. Process.* 76 (2), 149–188.
- Mason, W., Suri, S., 2012. Conducting behavioral research on Amazon's Mechanical Turk. *Behav. Res. Methods* 44 (1), 1–23.
- Masten, A.S., 2001. Ordinary magic: resilience processes in development. *Am. Psychol.* 56 (3), 227.
- McEvoy, D., Fünfgeld, H., Bosomworth, K., 2013. Resilience and climate change adaptation: the importance of framing. *Plan. Practice Res.* 28 (3), 1–14.
- Nelson, D.R., Adger, W.N., Brown, K., 2007. Adaptation to environmental change: contributions of a resilience framework. *Annu. Rev. Environ. Resources* 32 (1), 395.
- Pennebaker, J.W., Chung, C.K., Ireland, M., Gonzales, A., Booth, R.J., 2007. The development and psychometric properties of LIWC2007. LIWC Net, Austin, TX.
- Pidgeon, N., Fischhoff, B., 2011. The role of social and decision sciences in communicating uncertain climate risks. *Nat. Climate Change* 1 (1), 35–41.
- Poussin, J.K., Botzen, W.W., Aerts, J.C., 2014. Factors of influence on flood damage mitigation behaviour by households. *Environ. Sci. Policy* 40, 69–77.
- Scheufele, D.A., Iyengar, S., 2014. The state of framing research: a call for new directions. In: Kenski, K., Jamieson, K.H. (Eds.), *The Oxford Handbook of Political Communication Theories*. Oxford University Press, New York.
- Schwartz, S.H., 1994. Are there universal aspects in the structure and contents of human values? *J. Social Issues* 50 (4), 19–45.
- Schwartz, S.H., Bilsky, W., 1987. Toward a universal psychological structure of human values. *J. Pers. Soc. Psychol.* 53 (3), 550.
- Strauss, B.H., Ziemlinski, R., Weiss, J.L., Overpeck, J.T., 2012. Tidally adjusted estimates of topographic vulnerability to sea level rise and flooding for the contiguous United States. *Environ. Res. Lett.* 7 (1), 014033.
- Taylor, S.E., 1983. Adjustment to threatening events: a theory of cognitive adaptation. *Am. Psychol.* 38 (11), 1161.
- Tebaldi, C., Strauss, B.H., Zervas, C.E., 2012. Modelling sea level rise impacts on storm surges along US coasts. *Environ. Res. Lett.* 7 (1), 014032.
- Tversky, A., Kahneman, D., 1981. The framing of decisions and the psychology of choice. *Science* 211 (4481), 453–458.
- Walton, G.M., Cohen, G.L., Cwir, D., Spencer, S.J., 2012. Mere belonging: the power of social connections. *J. Pers. Soc. Psychol.* 102 (3), 513.
- Werner, E.E., 1993. Risk, resilience, and recovery: perspectives from the Kauai Longitudinal Study. *Dev. Psychopathol.* 5, 503.
- Wong-Parodi, G., Fischhoff, B., 2015. The impacts of political cues and practical information on climate change decisions. *Environ. Res. Lett.* 10. <http://dx.doi.org/10.1088/1748-9326/10/3/034004>.