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Investigating Belief Falsehood. Fear Appeals Do Change Behavior in Experimental Laboratory Studies. A Commentary on Kok et al. (2018)

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In an interesting, provocative piece, Kok, Peters, Kessels, ten Hoor, and Ruiter's (2018) point to a conclusive lack of evidence demonstrating the efficacy of fear appeals. Chief among their various arguments is that there is no scientific data supporting a positive effect of fear appeals on performance of the behavior advocated in the message. This claim is followed by the important point that fear appeals cause defensive reactions and therefore negative behavioral effects, mainly when self-efficacy is low.

Kok and colleagues cite a meta-analysis conducted by Tannenbaum et al. (2015). Although they recognize that our synthesis failed to find negative effects, they attribute this failure to the lack of proper analysis singling out behavioral effects in the conditions that produce defensive processing and comparing fear with no-fear controls. We appreciate Kok et al.'s detailed inspection of our meta-analysis. We reported effects that averaged attitudes, intentions and behaviors because we were interested in testing a number of theories that made further decomposition of effects unwieldy. However, our analysis and many other supplementary analyses examined the possibilities that Kok et al. mention. We are delighted to report them here.

Our meta-analysis provides, to the best of our knowledge, a comprehensive synthesis of research on the use of fear appeals and their effects on various outcomes in an experimental setting. Although the methods are reported in detail elsewhere (see Tannenbaum, 2015), the pertinent criteria for inclusion of studies into the meta-analysis were: (a) an experimental research design, (b) a comparison group, and (c) experimental manipulation of depicted fear across groups. The syntheses we have conducted for this commentary used between-group standardized mean differences, which were analyzed using random-effects meta-analysis models to account for significant heterogeneity. More positive effects represent a positive effect of the fear appeal on the behavior recommended in the message.

Kok et al.'s primary argument suggests that there is not appropriate evidence to suggest that fear appeals change behavior. They state: "Tannenbaum et al. (2015) report on a meta-analysis... they still combine various outcomes, i.e., attitudes, intentions and behaviors, into one single effect size, and fail to report on studies with behavioral outcomes separately." We

here supply results for studies that used a behavioral measure as the outcome variable and compare the effects of a high fear with a low or no fear comparison condition.

For studies that compared effects of a high fear manipulation with a no fear control group, the average effect size for behavior was both positive and significant ($d = 0.357$, 95%CI: [0.207, 0.506], $k = 31$; see Figure 1). When the comparison group was low fear instead of no fear, the effect diminished but remained significant ($d = 0.200$, 95%CI:[0.063, 0.337], $k = 48$). As we conducted these analyses, we also investigated whether behavioral effects differed for one time and repeated behaviors, as we found moderation for the omnibus effect. Fear appeals recommending one-time behaviors had moderate effects ($d = 0.537$, 95%CI: [0.222, 0.852], $k = 9$) and those recommending repeated behaviors had small effects ($d = 0.283$, 95%CI:[0.114, 0.452], $k = 22$). In both cases, however, fear appeals yielded positive behavior change. These effects remained after controlling for the presence of written vs. visual messages ($d = 0.407$ vs. $d = 0.372$, $p > .05$), and low vs. high vividness of the message ($d = 0.358$ vs. 0.397 , $p > .05$) if they were manipulated in the studies via mixed effect meta-regression, thus isolating the effects of fear appeals from other features.

Of course, one may wonder whether or not there is evidence that the experienced fear induced by a fear appeal produced behavior change. Tannenbaum et al. obtained between-group differences in perceived fear or threat between the fear appeal condition and a comparison group. We conducted a random effects meta-regression of between-group differences in behavior on between-group differences in self-reported fear for high fear conditions compared with no fear control conditions. Overall, although the number of studies was small, the association between differences in reported fear and difference in behavior performance was significant and positive ($k = 10$, $R^2 = .473$, see Figure 2). These findings thus suggest that even truly fear-inducing appeals are associated with positive behavior change.

The other major point Kok et al. (2018) make is that under certain conditions, specifically in individuals with low self-efficacy, fear appeals will cause defensive responses that result in negative effects. They state: “that in the combination of high threat and low efficacy one may expect defensive responses”. But how frequent are negative effects of fear appeals when self-efficacy is low? In the complete meta-analytic dataset that included intentions and attitude, 6% of studies with low reported self-efficacy, and 3% of studies with high reported self-efficacy, produced significant negative effect sizes. A Fisher’s exact test comparing the frequency of negative effect sizes in these two sets of studies found no significant difference in the rate of negative effects ($p = .540$). Furthermore, because Kok et al. (2018) focus on behavior, we conducted this analysis for behavior ($k = 31$). We found that 16% (4/25) of the effects from the studies with low depicted efficacy and 33% (2/6) of the effects from studies with high depicted efficacy were negative. Once again, the Fisher’s exact test revealed no difference in the rate of negative effects as a function of depicted self-efficacy ($p = .567$). In sum, there was no evidence that low efficacy messages backfired. We realize that frequency counts to determine the presence of an effect is not an ideal method for conclusive evidence. However, all average meta-analytic effects in our database were positive in aggregate, suggesting that overall effects do not reflect a defensive response among participants in high fear/low efficacy conditions.

One final point Kok et al. make is that severity and susceptibility have multiplicative effects for inducing threat via fear appeals. They state: “Severity and susceptibility are assumed to multiplicatively combine to form a perceived threat” and that ideally “a threat’s severity and susceptibility” should both be manipulated when testing fear appeals.

Here, there is little available evidence to test the claim. Ten studies in our meta-analysis manipulated both susceptibility and severity, and another 19 manipulated only severity. Both manipulations had significant positive effects on behavior ($d = 0.377$, 95%CI:[0.165, 0.589]; $d = 0.317$, 95%CI:[0.097, 0.537], respectively). We found only one study each that manipulated only susceptibility or neither. The effect sizes from the available studies in each combination of susceptibility and severity levels appear in Table 1 (see supplemental materials). Although the k in some cells prevented a formal analysis, each of the cells contained positive effects of fear appeals on behavior.

Taken together, these findings suggest that fear appeals are an effective means of inducing health behavior change. However, we openly admit that these results only provide support for these effects at the aggregate level. It is quite easy to invoke Simpson’s Paradox and state that self-efficacy effects only show up at the individual level – we do not address that issue here. We conclude that fear appeals research should continue and that policies should continue to employ fear appeals because, at the population level, they appear to induce positive effects for a wide variety of behaviors. However, our team has also shown that fear is less effective than more sophisticated and expensive interventions such as those designed to train new behavioral skills among recipients, although they are rarely less effective than no intervention (c.f. Earl & Albarracín, 2007; for other emotional appeals, see Earl, Nisson, & Albarracín, 2015). Still, when fear appeals are compared with no message or with a message with a lower fear level, the answer to the question of efficacy is a resounding “yes, they work!”

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

- Earl A, & Albarracín D (2007). Nature, Decay, and Spiraling of the Effects of Fear-Inducing Arguments and HIV Counseling and Testing: A Meta-Analysis of the Short- and Long-Term Outcomes of HIV-Prevention Interventions. *Health Psychology*, 26(4), 496–506. 10.1037/0278-6133.26.4.496 [PubMed: 17605570]
- Earl A, Nisson CA, & Albarracín D (2015). Stigma Cues Increase Self-Conscious Emotions and Decrease Likelihood of Attention to Information about Preventing Stigmatized Health Issues. *Acta de Investigación Psicológica*, 5(1), 1860–1871. 10.1016/S2007-4719(15)30006-5 [PubMed: 29809200]
- Kok G, Peters GJY, Kessels LTE, ten Hoor GA, & Ruiter RAC (2018, 12 28). Ignoring theory and misinterpreting evidence: the false belief in fear appeals. *Health Psychology Review*, pp. 1–15. 10.1080/17437199.2017.1415767

Tannenbaum MB, Hepler J, Zimmerman RS, Saul L, Jacobs S, Wilson K, & Albarracín D (2015).
Appealing to Fear: A Meta-Analysis of Fear Appeal Effectiveness and Theories. *Psychiatric
Bulletin*, 141(6), 1178–1204. 10.1037/a0039729

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Figure 1.
Forest Plot of High Fear vs. No Fear Control for Between-Group Behavior Change (d)

Figure 2. Meta-regression of Behavior Change on Reported Fear

Random-effect model of univariate relation of between-group comparisons for High Fear vs. No Fear Control for Behavior Change and High Fear vs. No Fear Control for Difference in Fear ($B = .357$, 95% CI:[0.073,0.641]; $k = 10$; $\text{adj-}R^2 = .473$; Residual $I^2 = 94\%$).