

## Original Papers

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Wojciech Kulesza\*   
 Dariusz Doliński\*\*   
 Paweł Muniak\*   
 Kamil Izydorczak\*\*   
 Rafał Węgrzyn\*\*\*   
 Aidana Rizulla\*\*\*\* 

# Exposing People to Others Not Following Recommendations Reduces Unrealistic Optimism. An Experiment During a Pandemic

**Abstract:** Forty years of research on Unrealistic Optimism - a delusion that negative events are less likely and positive events are more likely to happen to oneself (in comparison to others) - has proved to be robust. Importantly, as a result, people holding this bias reduce their engagement in health prevention and following medical recommendations, etc., leading to the conclusion that this bias is dangerous. However, there is hardly any research on how to reduce this bias. To address this issue, an experiment in the real-life context of the COVID-19 pandemic was run. It was found that participants' Unrealistic Optimism was reduced when they were exposed to the behavior of others who did not follow medical recommendations.

**Keywords:** *Unrealistic Optimism reduction, experiment, health prevention, applied social psychology, COVID-19.*

Unrealistic Optimism bias (UO) - the tendency for a person to believe that negative events are less likely to happen to her/him in comparison to others, whereas the reverse is true for positive events (Weinstein, 1980). Importantly these biased comparisons may be very harmful for a person holding this view as well as her/his social environment. Based on this, perspective research on the reduction of this bias is not only important, but - in the face of the present and future pandemics - also urgent. The present paper experimentally addresses this issue.

## UNREALISTIC OPTIMISM BIAS

Much research on UO has shown that this bias is present in many areas of our lives in which we may compare ourselves to others. For example, people are delusional about the likelihood of car accidents (others are at a greater risk of being a victim - Rutter et al., 1998), divorces (others are at a greater risk of being divorced - Lin & Raghbir, 2005), or substance abuse (others are at a greater risk of becoming addicted - Nezlek & Zebrowski,

2001). As indicated by Weinstein, people also expect that positive events will happen to them in comparison to others. For example, people holding this bias declare that they are more likely to achieve high scores in exams (Lewine & Sommers, 2016) or a high salary (Ferd et al., 1996).

Importantly, from the scope of the present paper, this bias is - in the long-term - harmful for a person affected by Unrealistic Optimism. For example, people addicted to nicotine are less prone to quit smoking, as well as underestimate their chances of being a victim of cancer, and are hence more exposed to danger stemming from this behavior (Dillard et al., 2006). Similarly, people who downplay the risk associated with alcohol experienced more alcohol-related problems (Dillard et al., 2009). Finally, unrealistically optimistic women were less likely to undergo mammographic screening (McCaul et al., 1996) increasing the risk of breast cancer. Taken together, this short review clearly shows that the Unrealistic Optimism bias may be harmful for a person holding this view. From this perspective it is important to research methods aimed at reducing this bias.

\* SWPS University of Social Sciences and Humanities, Warsaw, Poland  
 \*\* SWPS University of Social Sciences and Humanities, Wrocław, Poland  
 \*\*\* University of Wrocław, Wrocław, Poland  
 \*\*\*\* Al-Farabi Kazakh National University, Almaty, Kazakhstan

Corresponding author: Rafał Węgrzyn, [rwegrzyn@swps.edu.pl](mailto:rwegrzyn@swps.edu.pl)

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## MECHANISMS OF UNREALISTIC OPTIMISM BIAS REDUCTION

To test the possibility of UO reduction, Weinstein (1983) introduced participants to not only a list of factors that could affect themselves but also some of them received estimations generated by others. The result was surprising: Unrealistic Optimism was much smaller, leading to the conclusion that egocentrism is responsible for developing and maintaining Unrealistic Optimism.

Subsequent studies supported this notion. For example, Dolinski and colleagues (Dolinski et al., 2021) expected that showing participants examples of behaviors of others who (do not) protect their health while being exposed to COVID-19 infection danger might - similarly to Weinstein's study - reduce egocentrism. In Experiment 1, participants read information ostensibly from a news website describing people following (or not) medical recommendations laid out for curbing the spread of COVID-19. Authors found that exposure to news in which recommendations were followed reduced Unrealistic Optimism. Surprisingly, Experiment 2 - in which TV news media was shown to study participants - delivered the opposite results. Observing a video of people who did not follow the recommendations reduced the Unrealistic Optimism bias. Experiment 3 shed light on these discrepancies, showing that reading news media involves more effort and in-depth analysis whereas videos are effortless to consume.

In another study testing egocentrism reduction as a possible mechanism responsible for Unrealistic Optimism reduction: mimicry which orients us toward others (Kulesza et al., in press). A large portion of the literature on mimicry shows that mimicry leads to mechanisms similar to egocentrism: for example, discovering similarities to others increases the tendency to mimic (Castelli et al., 2009; Van Swol & Drury-Grogan, 2017) as well as priming participants on others (Van Baaren et al., 2004). Mimicry also orients our attention to others: mimicry led to an increased tendency to provide help (Van Baaren et al., 2004) and to perceive the world as more just (Stel et al., 2013). On this basis, the authors expected that mimicking unrealistically optimistic participants would decrease this bias. Surprisingly, the results were directly opposite: mimicry fueled the Unrealistic Optimism bias.

Finally, in a line of research testing egocentrism as a mechanism responsible for reducing the Unrealistic Optimism bias, participants were asked to provide reasons for being more/less exposed to dangers like COVID-19 infection (Kulesza et al., in press). It turned out that in two consecutive experiments (run on a large sample  $n = 1,330$ ), those who generated reasons for being more exposed reported a reduction in the Unrealistic Optimism bias.

### UNREALISTIC OPTIMISM BIAS IN THE COVID-19 ERA

Unrealistic Optimism during the COVID-19 pandemic has been reported internationally, proving the pervasiveness of this bias among people around the world:

Kazakhstan and Iran (Kulesza et al., 2021), France, Italy, Switzerland and the United Kingdom (McColl et al., 2022), Italy and Romania (Druică et al., 2020), and finally Poland (Dolinski et al., 2020; 2021).

Importantly, a recent study supported the robustness of the Unrealistic Optimism bias by showing: (1) its persistence over time, and (2) its persistence even in the face of information, delivered via (social) media, regarding the clear and present danger of the COVID-19 pandemic (Izydorzak et al., in press). Assessing the persistence was especially important since until now, there has been no research proving the escalation or deescalation of the bias over time. In detail, a study was run for a 12 months for the same participants ensuring that a possible change in perception of the risk and danger has its roots not in the different study participants, but in an evolution taking place in the study respondents. Results showed that 120 participants reported the Unrealistic Optimism bias, but the magnitude of this bias changed. Interestingly, this change was not grounded in intuitive information regarding the risk and danger (i.e., daily new cases/deaths of COVID-19), but in the governmental restrictions aiming to curb the number of infections and deaths: when the restrictions were tightened, the bias escalated.

Direct consequences, other than medical, were shown in another paper by Dolinski and colleagues (2021). In that study it was shown that restaurant workers - a group at high risk of being infected by COVID-19 as well as greatly spreading the virus - were unrealistically optimistic not only in terms of infection chance (lower), but also about the risk of closures in this business segment (low).

More nuanced comparisons (previously and classically: between "participants" and a "close peer") have provided interesting additions to the picture of the Unrealistic Optimism bias during the COVID-19 era (Kulesza et al., 2022). In that study participants estimated the risk of COVID-19 infection for themselves and their peers, but also between (un)vaccinated participants, and (un)vaccinated peers. Results indeed replicated the presence of the Unrealistic Optimism bias (lower risk estimations for "self"), but interestingly it turns out that unvaccinated people believe that vaccines are an effective tool to reduce the risk of infection, but not for themselves.

Finally, a recent study completed the complex picture of the Unrealistic Optimism bias in the COVID-19 era by showing, across two studies, that this bias is irrational: the perspective of acquiring vaccines (a rational method of risk reduction and infection prevention) did not change the bias (Salvador Casara et al., 2022).

### THE GOAL OF THIS STUDY

The broad review of the body of literature on Unrealistic Optimism, firstly, clearly shows that on the one hand a number of studies have proven its robustness and negative consequences, while on the other hand there is a small amount of research on how to reduce this potentially dangerous bias. Secondly, even if some studies deliver direct mechanisms to achieve this goal, they are not

free from caveats. For example, the clear caveat stemming from this research is that in Dolinski and colleagues' studies, participants were exposed to media information, whereas the vast majority of social information we gain is from daily interactions: at work, public transportation, fitness, schools, churches, etc. The aim of the present paper is to fill these two important gaps: (1) to deliver more data expanding knowledge on UO reduction, and (2) to address caveats regarding the existing body of literature on this issue. We have unpacked these issues in a natural setting of the COVID-19 pandemic (participants did not have to imagine being under threat while they were experiencing lockdown, curfews, etc., strengthening our study).

## THE HYPOTHESIS

Orienting participants towards others - as egocentrism leads to a reduction in the Unrealistic Optimism bias - in the context of the COVID-19 pandemic (risk estimation for infection for self vs. peer) leads to mixed predictions. On the one hand, mimicry (a less direct egocentric mechanism) leads to an increase in Unrealistic Optimism (Kulesza et al., in press). On the other hand, direct exposure to others leads to mixed results: indirect exposure (via media news) leads to Unrealistic Optimism reduction (as expected by the egocentrism reduction hypothesis) but more direct exposure (films, TV news media) leads to an increase in this bias (Dolinski et al., 2022). Taken together we hypothesize that exposing participants to others will change the Unrealistic Optimism bias. However, due to the inconsistency in results, the direction of the change, i.e., escalation vs. deescalation, is hard to predict.

## STUDY

### Method

#### Participants

Sixty-two participants (39 women, 22 men, 1 non-binary person:  $M_{age} = 25.01$ ,  $SD_{age} = 8.94$ ), 18 to 59 years of age, agreed to take part in the experiment. Two female participants ( $M_{age} = 22.0$ ,  $SD_{age} = 1.41$ ), aged 21 to 23, were excluded from the analyses. One had previously tested positive for COVID-19 (giving this person a reasonable expectation of being more immune than others) and the other disregarded the experimenter's instruction by not using hand sanitizer (see procedure for details). The final sample consisted of 60 participants (37 women, 22 men and 1 non-binary:  $M_{age} = 25.17$ ,  $SD_{age} = 9.07$ ), 18 to 59 years of age. Participants received course credit for their participation.

The sample size was not determined a priori since the study was conducted during the COVID-19 pandemic under sanitary stringency. We collected data from as many participants as possible during the academic year in which the study was run.

#### Procedure

The study took place in a laboratory at university. The colleague who conducted the experiment picked up each participant from a pre-arranged location at the university,

and then they went to the laboratory together. Upon entering the laboratory building, participants saw a hand sanitizer dispenser with a clear sign requesting mandatory use. When the participant passed the station, s/he was asked to wait in the hall until instructed to enter the room. While waiting, the participant saw three other participants entering the same laboratory who were verbally instructed by the confederate conducting the experiment to sanitize their hands. This event was easily visible to the participant. In the first condition, the people followed the instructions (positive condition,  $N = 26$ ). In the second condition, they did not follow the instructions (negative condition,  $N = 34$ ). Participants were randomly assigned to experimental conditions. The number of participants between experimental conditions was counterbalanced,  $\chi^2(1, N = 60) = 1.07$ ,  $p = .302$ ). In the room, participants completed a short questionnaire assessing Unrealistic Optimism, and indicated their age and gender. The experiment was run between October 17, 2020 and November 8, 2020 at a time when vaccines were not available.

This study was approved by the local ethics committee. Informed consent was obtained from all participants before enrollment in the experimental procedures and data collection.

## RESULTS

The statistical software JASP (JASP Team, 2022; Version 0.16.3) was used to run the analysis with a combination of the R programming language implemented in RStudio v. 4.0.5 (R Core Team, 2021) with the "tidyverse" package (Wickham et al., 2019) and "ggpubr" package (Kassambara, 2020) used to create a plot. Dataset, data analysis and script for the plot are accessible at the Open Science Framework (OSF; <https://osf.io/sw7cf/>).

To check whether the experimental condition influences the risk assessment for oneself and average friend, a univariate repeated measures ANOVA with a 2x2 experimental design was carried out: 2 (experimental condition) x 2 (unrealistic optimism assessment).

Levene's test indicated that variances did not differ considering estimating self risk infection ( $F = 3.37$ ,  $p = .072$ ), and estimating risk infection of others ( $F = 3.94$ ,  $p = .052$ ).

The main effect of unrealistic optimism bias,  $F(1, 58) = 6.91$ ;  $p = .011$ ;  $\eta_p^2 = .11$  ("Me":  $M = 6.73$ ,  $SD = 2.2$ , "Peer":  $M = 7.28$ ,  $SD = 2.08$ ), and the main effect of the experimental condition were significant:  $F(1, 58) = 8.66$ ;  $p = .005$ ;  $\eta_p^2 = .13$  (Negative:  $M = 6.4$ ,  $SE = 0.32$ , Positive:  $M = 7.81$ ,  $SE = 0.36$ ).

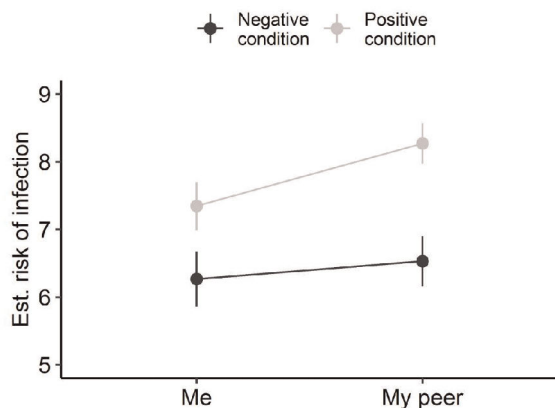
Although the interaction effect was not significant:  $F(1, 58) = 2.12$ ;  $p = .150$ ;  $\eta_p^2 = .04$ , an exploratory *post hoc* with Bonferroni correction analysis was run. In one pair — that is, the positive condition — the difference was very close to significance:  $t(59) = -2.71$ ,  $d = -0.35$ ,  $p = .052$ . Respondents assessed the probability of falling ill for an average friend as higher ( $M = 8.27$ ,  $SD = 1.51$ ) than themselves ( $M = 7.35$ ,  $SD = 1.81$ ). In the negative

condition, this bias was not observed ( $t(59) = -0.9$ ,  $d = -0.12$ ,  $p = .1$ ) (see Figure 1).

The simple main effect analysis revealed that the main effect of unrealistic optimism was present in the positive condition:  $F(1) = 7.30$ ;  $p = .012$ , but not in the negative condition:  $F(1) = 0.80$ ;  $p = .378$ .

Since parametric *post-hoc* revealed one non-significant and one barely significant difference between the conditions, we decided to assess the support for the null hypotheses in the post-hoc comparisons, using a Bayesian *t*-test for dependent samples implemented in JASP software (JASP Team, 2022; Version 0.16.3). We used the default prior distributions (zero-centered Cauchy distribution with  $r = 0.707$ ) and computed the Bayesian factor in support of the null hypotheses ( $BF_{01}$ ).

First, we verified the difference between the estimated risk in the positive condition. This analysis yielded a value of the Bayes factor below 1 ( $BF_{01} = 0.25$ ) which cannot be considered as evidence supporting  $H_0$  (Wagenmakers et al., 2011). We then verified whether there is no difference between the estimated risk infection in the negative condition. This analysis yielded a value of Bayes factor above 3 and below 10 ( $BF_{01} = 3.77$ ) which can be considered as “moderate” evidence for  $H_0$  (Jeffreys, 1961, as cited in Wagenmakers et al., 2011, p. 429).



**Figure 1.** UO effect in two experimental conditions. Dots represent means and vertical bars represent standard errors

## DISCUSSION

Unrealistic Optimism is a dangerous form of bias leading to dangerous consequences for the person holding this delusional way of perceiving the world, such as a greater risk of developing cancer (Dillard et al., 2006; McCaul et al., 1996), and alcohol addiction (Dillard et al., 2009). From this perspective, recent papers show another clear danger of this bias: all around the world, study participants report greater chances for COVID-19 infection for peers rather than to themselves (Dolinski et al., 2021; Dolinski et al., 2022; Druică et al., 2020; Izydorczak et al., in press; Kulesza et al., in press; Kulesza et al., 2020; McColl et al., 2022). For this very reason the search for mechanisms to reduce this bias is highly important. The main mechanism responsible for reducing Unrealistic

Optimism is reducing egocentrism (Weinstein, 1983) and the present papers join this effort.

Pictures of other people who do not follow the recommendations reduced the unrealistic optimism bias. In other words, being shown such a picture reduces optimism bias.

In the existing body of literature on UO it is unanimously assumed that this bias stems from social comparisons with others. For example, when “I” compare myself with “average peers” in terms of possible heart failure, “I” may perceive myself as less prone to this danger (e.g., “I” eat healthily and exercise, ergo: “I” am less at risk). Infectious diseases in social comparisons are very different as when one does not follow recommendations to reduce the risk of infection (in the case of COVID-19: hand washing, social distancing, wearing masks) it may bring greater risk for oneself even if one’s behavior is less risky and more responsible than other people’s. This is exactly what we simulated in our study. In this case we can speak of a wider perspective of biased social comparisons.

As mentioned above, subsequent studies by Doliński supported this notion (Dolinski et al., 2021). In Experiment 1, the authors found that exposure to news in which recommendations were followed reduced Unrealistic Optimism. Surprisingly, Experiment 2 - delivered the opposite results: observing a video of people who did not follow the recommendations reduced the Unrealistic Optimism bias. Experiment 3 shed light on these discrepancies.

On the other hand other studies targeting the reduction of the Unrealistic Optimism bias in the context of COVID-19 provide contrary results: mimicry increased this bias (in comparison to the control condition where no mimicry behavior was present; Kulesza et al., in press). Additionally, direct exposure to films depicting behaviors of others led to the same result (Experiment 2, Dolinski et al., 2022). From this perspective and with the present data in hand, it is unclear how egocentrism reduction leads to a reduction in Unrealistic Optimism.

Generally, on the grounds of psychology studies were run on psychological functioning of people during pandemics (Cooke et al., 2020; Debowska et al., 2020; Dryhurst et al., 2020; Wang et al., 2020). Our research shows that a possibly small and unimportant factor (watching others (not) following restrictions and medical recommendations) may clearly influence perceptions of reality as well as self- and others-perception. From this perspective our research helps to understand human functioning under an ongoing pandemic in general, not only - as in the case of this research - during the COVID-19 pandemic.

## LIMITATIONS

The study described above was run during the COVID-19 pandemic making it - on the one hand - a great opportunity for a natural experiment. On the other hand, however, we do not know if our manipulation and the results based on it is applicable in other, non-COVID-19 contexts so we are not able to address the generalizability of this effect. We have no reasons to think differently, but

with the present data in hand we are unable to address this very important issue.

Another issue is the fact that participants knew - similarly to Dolinski and colleagues' study (Dolinski et al., 2021) - that they were participating in a study, making them more eager to control themselves. Contrary to Dolinski's original work, one should keep in mind that participants were waiting to participate in a reception area. They did not know that the experiment had already started. We are, however, convinced that future studies might base such experiments in more naturalistic settings.

Next, one should keep in mind that this study was run at a time when vaccines were not available. On the one hand, this is an advantage as we had to control only one aspect that was preventative against future infection: past infection and antibody level. On the other hand, we cannot answer if people would judge their UO differently after exposure to this experimental situation when being vaccinated (or not).

The low number of participants is another limitation of this study. Future studies should address this issue surrounding possible theoretical and practical implications. One should however keep in mind that our research - to make it as realistic as possible - was run during lockdowns at the university so inviting more participants was not possible.

In real social situations, media may influence one's subjective perception with great variance depicting people (not) following rules and medical recommendations. We cannot rule out that large numbers of such reports and pictures delivered via (social) media could influence a different pattern of results from those reported above.

Another limitation is the demographic characteristics of our respondents. While we managed to include middle-aged people, more than 80% of participants were below the age of 30, which constitutes a limitation for the generalizability of our conclusions.

Finally, we were unable to control many additional variables like being exposed to death or serious illness stemming from COVID-19.

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## ETHICS

The study was approved by the local ethics committee (opinion number: 02/P/08/2020). Informed consent was obtained before enrollment.

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