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[Vanessa K. Bohns, Francis J. Flynn. "Underestimating our influence over others at work", Research in Organizational Behavior, 2013](#)

Copyright © 2017 American Scientific Publishers All rights reserved Printed in the United States of America RESEARCH ARTICLE Advanced Science Letters Vol. 23, 12198–12201, 2017 Social Influence and Energy Conservation: Using Obedience to Authority to Promote Air Conditioning Energy Saving Wayan G. Santika^{1*}, I. Ketut Gede Sudiarta², and I. Made Widiarta³ 1Mechanical Engineering Department, Politeknik Negeri Bali, 2Electrical Engineering Department, Politeknik Negeri Bali, 3Business Administration Department, Politeknik Negeri Bali, Jalan Kampus, Bukit Jimbaran, Kuta Selatan, Badung, 80634, Bali, Indonesia The present study applies social influence to promote energy conservation.

Specifically, we examined the effect of obedience to authority on persuading users of air conditioners (AC) to set higher temperatures. Sixty eight students participated in the study and were divided randomly into two equal groups: control and experimental groups. They were asked to turn on an AC and set a temperature. In order to activate the tendency to obey authority, participants in the treatment group were told that a government regulation encouraged people to set their AC temperature at 25 °C prior to turning on the appliance. Results indicate that there was a significant difference between the two groups. Participants in the treatment group were more likely to set their AC temperature at 25 °C than those in the control group. This finding is consistent with previous research on obedience to authority. Goldstein, 8 obedience to authority is related to our tendency to accept without questioning any order or request from authority figures or experts, particularly in uncertain situation in the seek for accuracy. Obedience to authority has been applied in various applications, such as tax compliance, 9 employment discrimination, 10 accounting, 11 12 and violent behavior. 13 14 In his classic experiment, Milgram 13 found that respondents were willing to administer a perceived deadly electric shock to a learner when it was ordered by a person in authority. Milgram experiment tells us how dangerous our natural predisposition to obey others in authority could be. A similar finding was reported by Mayhew and Muphy 12 in a different setting employing accounting students as participants. They find that misreporting behavior increases when there are instruction to do so from someone in authority. Another study by Brief et al. 10 examining employment discrimination toward people from a minority group (black people in this case) shows that participants tend to discriminate the minority candidates when there is a clear instruction to do so from a legitimate authority. By triggering their propensity to comply to a person perceived as in authority, we expected that participants who were told by an experimenter that government regulation encourages people to set their air conditioning temperature at 25 °C will be enticed to set their AC temperatures at or close to 25 °C. There is an actual government regulation named The Regulation of the Ministry of Energy and Mineral Resources of the Republic of Indonesia No. 13/2012a stating that room temperatures of residence spaces and government office buildings should be set at 24–27 °C. The experimenter, who saliently showed himself as a enough to persuade participants to set room temperatures at or close to 25 °C. Results of the study and their implications are discussed in Results and Discussion section. 2. METHODOLOGY The experiment was conducted in a laboratory setting. A room with a split air conditioning system was set. Figure 1 shows the room setting of the experiment. Sixty eight respondents (53 males and 15 females), who were at their first year undergraduate program at a university in Bali, were asked to voluntarily participate in the experiment and randomly assigned to either the control or treatment groups. Participants in the control group, one at a time, were asked to enter the room and a confederate waited inside and told the participant to imagine that she/he was in her/his own room at home and asked to turn on the air conditioner and chose the temperature that they like. Once it was done, the respondent was allowed to leave the room and the confederate recorded the temperature being chosen. Participants in the treatment group had to do a similar task in which each of them imagined her himself being in her/his room and was asked to turn on the air conditioning. However, prior to doing the task, they were told that the government has a regulation in which people were encouraged to have their AC room temperatures set at 25 °C in order to conserve energy. Respondents then performed the task and left the room. When all data were collected, participants were debriefed. The temperature a participant chose indirectly suggested the amount of energy the air conditioning system consumed.

rwleehgseitlaeirmtchahteer/mlaeucstthusoaregriret,yarb(esoepureetsttehheetegdwoovraekurnthomoIfPerniB:ttly1aCrs8ebsog21au5ps.l2ey indicates lower energy consumption about expert and legitimate authorities). Expert authority can be seen as someone perceived as having some particular skill and expertise. A lecturer or researcher is commonly perceived as someone possessing special knowledge and skills. In addition, legitimate authority is related to someone who is actually in authority or something which has been a product of a legitimate action. The purpose of the present study is to know whether exposure to obedience to authority condition in which the government encourages its people to set their air conditioning temperature to 25 °C will actually make people set their AC temperatures close to 25 °C. Simply telling someone that the government encourages its people to set their air conditioning temperature at 25 °C, we believe, will activate obedience to authority, especially the legitimate authority. The message, delivered by a lecturer which is also a scientist, is expected to trigger obedience to expert authority (in this case, according to the work of Guéguen and Jacob, 16 a lecturer/researcher is considered a high status expert). In addition, the experimental setting, at which respondents were exposed to the task, is meant to elicit an uncertain situation for participants to seek accuracy through compliance by being in line with the message. We predict that participants will react accordingly to the message despite the fact that the government, as the legitimate authority, does not physically present before participants' eyes. The message delivered by a perceived expert will be strong in Indonesian: [Peraturan Menteri Energi dan Sumber Daya Mineral Republik Indonesia Nomer 13 Tahun 2012](#). 3. RESULTS AND DISCUSSION Results show that the average temperature of the control group is 21.35 °C which is much lower than that of the treatment group of 24.06 °C (see Table I and Fig. 2). An independent t-test was conducted to compare the average temperatures set by respondents in the obedience group and the control group conditions. There was a significant difference in the temperatures set by the obedience group (M = 24.06 °C, SD = 2.745) and control group (M = 21.35 °C, SD = 2.777), $t(66) = 4.265$, $p < 0.0001$. The results suggest that providing information about the government regulation which encouraged people to set AC temperature at 25 °C really had an effect on AC temperatures set by respondents. In other words, when obedience to authority was triggered, participants in the obedience group set higher AC Fig. 1. The experimental setting. 12199 RESEARCH ARTICLE Adv. Sci. Lett. 23, 12198–12201, 2017 Table I. Descriptive statistic. Experiment Control Treatment N 34 34 Mean temperature 21.35 24.06 Std. deviation 2.773 2.449 Std. error mean .476 .420 of motivating people to set AC temperature at 25 °C, the sticker may depict a high status scientist describing the government regulation about the AC setting temperature. Future research needs to address the application of obedience to authority in these contexts. To date, the authors could not find any study addressing the issue of promoting energy conservation and ads using obedience to authority approaches. temperatures in accordance with the message than those in the An interesting finding during the experiment was that very few control group. A simple message, when delivered in a clever way, people knew about the regulation. More efforts are needed in can socially influence people to act accordingly. order for the information to reach a wider audience. The sticker The finding of the study is in line with those done by Guéguen idea can be a good starting point. Another surprising finding was and Jacob, 16 Cadsby et al., 9 Brief et al., 10 Davis et al., 11 and that many respondents did not aware about the fact that higher Milgram 14 that, when exposed to a condition in which their natural AC temperature setting means less energy consumption. More- ral propensity to comply to authority orders are exploited, people over, most of them thought that setting the room temperature at tend to act in accordance with the orders. Guéguen and Jacob, 16 the lowest point would cool the room faster than that at higher for example, found that people agree more favorably to participate- temperatures, which is not the case. The room temperature set- pate in an e-mail survey when requested by a higher status expert ting only indicates the temperature at which users like it to feel than a lower status one. A similar finding was found by Davis comfortable and has nothing to do with how fast the appliance et al. who demonstrated that management accountants behaved in will cool the room. dysfunctional ways

when confronted with the pressure to comply. There are some limitations of the study. First, the facts that to an immediate superior. The experimenter was male and most respondents were also male. Some scientists suggest that our predisposition to comply to Guéguen and Jacob (18) found that male respondents tended to those in authority has some evolutionary advantages. For example, be more dutifully complying with the request from someone in ple, Bouchard (17) suggested that humans have adapted to obey other authority than female. They also found that respondents more often since early ages in order to increase their chance of survival readily obeying a request from a female who is in authority and this tendency is brought about until adulthood. Moreover, than that from a man of the same position. The results might we conform to the social influence of others for accuracy, affiliation slightly be different if more female participants were included. Iation, and for maintaining positive self-concept and these goals or if a female experimenter in authority delivered the message. are basically an adaptation for a better chance of survival. (8) Obey- Second, the experimental setting may trigger responses that were in others, especially experts and those in authority. People's tendency to obey authority is people's tendency to main- us avoid mistakes and increases acceptance of expert authority. The implication of the finding is that, when a message is care- resent a more pro-environmental choice and, thus, are socially fully and effectively designed to activate the tendency to obey more desirable. However, since it is a natural predisposition, it an authority figure, we can expect people to behave in our favor. would affect both groups equally. Another limitation is that all It means that messages triggering obedience to authority may be participants were students. The situation may limit the general- produced for a broad range of purposes: from encouraging people to conserve energy to asking people to stop smoking to advertising recruiting participants from a wider audience. tising a product. For instance, the government warning ads that encourage people to stop smoking may have to be paraphrased.

4. CONCLUSIONS to convey expert authority in order to provoke a higher degree of Energy conservation is as important as energy efficiency and it compliance. Another potential application in promoting energy usually requires behavioral change and comfort sacrifice. In order conservation is by creating stickers with a carefully designed to encourage people to conserve energy, we apply a persuasion message placed in highly visible areas. For the special purpose technique called social influence. In particular, we manipulate human natural tendency to obey others in authority, commonly called obedience to authority, to persuade people to conserve energy. [The purpose of the present study](#) is to know whether exposed to obedience to authority condition in which the government encourages its people to set their air conditioning temperature at 25 °C will actually make people set their AC temperatures at or close to 25 °C. Sixty eight respondents were asked to voluntarily participate in the experiment and randomly assigned to either the control or treatment groups. Participants in the treatment group had their predisposition to obey others in authority activated and then were asked [to turn on an AC and set the temperature](#) by mean of a remote controller. Respondents in the control group were only requested [to turn on an AC and set the temperature](#). Fig. 2. Comparison of the mean temperatures set by control and obedience Results show that participants in the treatment group set higher groups. AC temperatures in accordance with the message than those in 12200 [Adv. Sci. Lett. 23](#), 12198–12201, [2017 RESEARCH ARTICLE](#) the control group. Results support the findings of previous studies applying the same principle of obedience to authority in different situations, namely tax compliance, employment discrimination, and violent behavior. Acknowledgments: The present study was funded by [The Ministry of Research, Technology and Higher Education of Indonesia under the scheme of Hibah Bersaing](#) number 04.3723/PL8/LT/2016. We would like to thank Wayan Sutarsa for his contribution during the experiment and I. D. M. Cipta Santosa for his feedback and critical review. References and Notes 1. H. Herring and R. Roy, *Technovation* 27, 194 (2007). 2. [R. Brännlund, T. Ghalwash, and J. Nordström, Energy Economics 29, 1 \(2007\)](#). 3. B. Alcott, *Ecological Economics* 54, 9 (2005). 4. S. Sorrell, [The Rebound Effect: An Assessment of the Evidence for Economy- Wide Energy Savings from Improved Energy Efficiency, UK Energy Research Center, London, UK \(2007\)](#). 5. W. [G. Santika, I. K. G. Sudiartha, and I. G. P. M. E. Putra, Using animated social feedback to motivate air conditioning energy saving, Proceedings of 2015 International Conference on Science and Technology, IEEE, Thailand \(2015\)](#). 6. [W. G. Santika and I. K. G. Sudiartha, Persuasive technology with normative feedback to reduce energy consumption, Proceedings of 2016 International Conference on Progress in Informatics and Computing, IEEE, Shanghai \(2016\)](#). 7. S. [J. Kantola, G. J. Syme, and N. A. Campbell, Journal of Applied Psychology 69, 416 \(1984\)](#). 8. [R. B. Cialdini and N. J. Goldstein, Annu. Rev. Psychol. 55, 591 \(2004\)](#). 9. [C. B. Cadsby, E. Maynes, and V. U. Trivedi, Experimental Economics 9, 343 \(2006\)](#). 10. [A. P. Brief, J. Dietz, R. R. Cohen, S. D. Pugh, and J. B. Vaslow, Organizational Behavior and Human Decision Processes 81, 72 \(2000\)](#). 11. S. Davis, [F. T. DeZoort, and L. S. Kopp, Behavioral Research in Accounting 18, 19 \(2006\)](#). 12. [B. W. Mayhew and P. R. Murphy, Contemporary Accounting Research 31, 420 13. \(S2.0M14il\)g.ram, Human Relations 18, 57 \(1965\)](#). 14. S. Milgram, [The Journal of Abnormal and Social Psychology 67, 371 \(1963\)](#). 15. [I. Blass, Journal of Applied Social Psychology 29, 955 \(1999\)](#). 16. N. Guéguen and C. Jacob, *CyberPsychology and Behavior* 5, 377 (2002). 17. [T. J. Bouchard Jr., Authoritarianism, religiousness and conservatism: Is "obedience to authority" the explanation for their clustering, universality and evolution, The Biological Evolution of Religious Mind and Behaviour, edited by E. Voland and W. Schievenhovel, Springer, Dordrecht \(2009\), pp. 165–180](#). 18. N. Guéguen and C. Jacob, *CyberPsychology and Behavior* 5, 139 (2002). 19. I. Krumpal, *Quality and Quantity* 47, 2025 (2013). [Received: 30 August 2016. Accepted: 30 May 2017. IP: 182.255.1.11 On: Thu, 17 May 2018 06:22:45 Copyright: American Scientific Publishers Delivered by Ingenta 12201](#)