

Forum

On the Heterogeneous Nature of Social and Physical Domains, Ignorance of Ignorance, and Rift Among Academic Community A Commentary on Kim (2020)

Dohyun Ahn¹

¹ Department of Journalism
and Public Relations,
Jeju National University,
Republic of Korea

Corresponding author

Dohyun Ahn
Department of
Journalism and Public
Relations,
Jeju National University,
102 Jejudaehak-ro,
Jeju-si, Jeju Special
Self-Governing Province
63243, Republic of Korea.
Email: dohyun@
socialbrain.kr

Acknowledgement

This research was
supported by the 2020
Sam Jeong research
fund of Jeju National
University.

Received

16 July 2021

Revised

24 August 2021

Accepted

01 September 2021

In the age of complexity, it seems obvious that solving problems require expertise from various disciplines. In the recent issue of *Asian Communication Research*, Kim (2020) proposed a new paradigm of linking heterogeneous groups among science, humanism, and art with an emphasis on forming interdisciplinary research (IDR) community. Forming community was presented as a process. According to Kim, the process of forming community is co-minding of six collective acts, which are co-exposing, co-focusing attention, co-cognizing, co-remembering, co-questioning, and co-imaging. The first sequence of co-minding processes is co-exposing and co-focusing: exposing to and paying attention to problems. With this sequence, individuals begin to be aware of problems from which common agenda emerge. The next sequence is co-cognizing and co-remembering: identifying situational elements and relating them via inside-outside, before-after, and/or similarity-difference relations. With this sequence, individuals think and understand the problems together. The final sequence is co-questioning and co-imaging: clarifying some fuzziness and raising further possibilities.

What is noticeable in Kim (2020) is distinguishing problems as situational problems and behavioral problems. Kim argued that “our problems harbor a duality: two kinds of problems — the situational one that threatens our life at a time and place and the behavioral (‘How’) one to solve it” (p. 21). In other words, to solve situational problems together, we first need to solve behavioral problems of forming community or of enacting problem-solving agency. Kim, however, pointed out that we are poorly poised for the behavioral problem — “the problem of community, that is, the [H]ow (e.g., procedures) to bring community into existence and then to give it effective capability as a ‘problem-solving’ agency” (p. 21).

What are further needed for IDR community building are recognizing that situational problems are two kinds (i.e., problems in social and physical domains), and dire problems such as climate change and epidemic diseases are fundamentally those of the social domain. Further, to solve behavioral problems for solving situational problems, it seems necessary to add additional components to the co-minding process of six collective acts especially in the social domain, because problems in the social domain often have to deal with individuals or groups who are ignorant of their ignorance with overconfidence about their limited knowledge and misleading intuitive epistemology (i.e., ignorance of ignorance problem, Dunning, 2011).

Situational Problems in Social and Physical Domains

All organisms that have successfully survived and reproduced have adapted to natural environments with their own strategies. Humans' core strategy adapting to natural environments is to form societies, which is so successful that humans have become one of dominant species on the Earth. Societies, however, for humans have become environments that they have had to adapt to. Thus, for humans, there are two kinds of environments that they have to adapt to: natural and social environments, and the latter is more critical for humans to survive and reproduce. Pressure for humans to adapt to social environments is so intensive and complex that human brains have mostly been evolved to solve in the social domains. According to the social brain hypothesis (Dunbar, 2009) and the cultural brain hypothesis (Muthukrishna et al., 2018), human's advanced intelligence is the by-product of evolutionary processes of solving problems in the social domain.

Since environments that humans have to adapt to are both natural and social environments, situational problems should also be categorized

into two domains: physical and social domains. What is more complex and challenging problems are those of the social domain. The main difference of social and physical domains can well be described by the analogy between the perception of people and the perception of things (Fiske & Taylor, 2013). People are intentional agents. Agents are the ones that generate behaviors that influence environment. There are three types of agent: logical agents, rational agents, and intentional agents (Ahn, 2020). Logical agents generate behaviors depending on rules. Rational agents generate behaviors following utility. Intentional agents that generate behaviors pursuing meanings do not always behave following rules or utility. People as intentional agents infer the state of others' mind or intentionality along with their own minds, and predicts the behaviors of others.

Phenomena generated by agents in the social domain are complex and challenging because, social environments, unlike those in the physical domains, are recursive and fluid. When people understand other individuals or others' minds, they typically mutually perceive back with each other in repeating and recursive ways. In other words, people infer others' minds along with their own minds like in front and back of mirrors. Further, people adapt their behaviors to what others might think and imagine what their own and others' thinking, which makes social environment fluid. In other words, social relations among intentional agents change continuously as they continuously perceive and respond to each other's thinking (Ahn, 2020; Fiske & Taylor, 2013; Frith, 2013; Lee, 2017).

Therefore, there are two kinds of situational problems; one is a situational-thing problem, and the other is a situational-people problem. The latter can also be termed as a situational-behavioral problem because situations are generated via behaviors by people as agents. For example, developing nuclear power is solving situational-thing problem, the problem-solving

in the physical domain. On the other hand, using nuclear power to fight climate change is solving situational-people problem (i.e., situational-behavioral problem), the problem-solving in the social domain. Since the nature of problems in social and physical domains are heterogeneous, behavioral problems to solve situational problems should be differentiated; one is for situational-thing problems and the other is for situational-people (i.e., behavioral) problems. A solution for the latter tend to be focused more on handling communication failure and power dynamics among social groups whose interests are often conflicting for economic, political, or psychological reasons.

Heterogeneous nature of problems in social and physical domains inevitably lead the way of problem solving to be diversified depending on goals, values, legal and institutional policies, and the consequences of alternatives. Such diversified nature of problem solving would require interdisciplinary approach, but to solve problems successfully in an interdisciplinary way, it should consider fundamental nature of problems whether the problems belong either more in the social domain or more in the physical domain.

Social Nature of Dire Problems

Dire problems that challenge us are mainly from those of the social domain. The problems such as climate change and epidemic or pandemic diseases that challenge us are fundamentally the problems of the social domain. Humans have tools to solve problems in the physical domain, but the tools have been misused or disregarded by social and psychological reasons.

In terms of pandemic diseases such as COVID-19, humans sequenced whole-genome of the virus within days, developed vaccines within months, and produced vaccines in massive scales within a year. In other words, in the physical domain, humans have found the way of solving problems of pandemic diseases. The

failure was in the social domain. For example, in May of 2020, daily vaccination doses began to drop significantly by all manufacturers including Pfizer and Moderna. It was after medicines regulators suspended the use of vaccines made by AstraZeneca and Johnson & Johnson because of a risk of rare blood clots (New York Times, 2020 May 13). As is the name indicated, it is very rare risk of blood clots, but medicine regulators limited the use of the vaccine without consideration of communicative implications (European Medicine Agency, 2021 April 7). Regulatory bodies' decision grabbed the attention of presses and public and vaccine safety became a main concern, which lead public to focus the safety of vaccination rather than the danger of un-vaccination. In the US where there are plenty of vaccines, share of people who received at least one shot of COVID-19 vaccine is less than 70% (Ritche et al., 2020). It was not due to the lack of vaccines or other resources in the physical domain, but was due to social and psychological hesitation.

The problem of climate change is not different from that of epidemic or pandemic diseases. What have made climate change worse was not the problems in the physical domain, but those in the social domain. Since commercialization of nuclear power technology which could provide energy reliably without fossil fuels (Office of Nuclear Energy, 2021, March 24; 2021, March 31), humans could have generated the most of energy while emitting near-zero green-house gases. It was fear and communication failure that made humans to disregard nuclear power (Ahn, 2021; Allison, 2021).

The fear was mainly induced from three nuclear power plant accidents in the Three Mile Island, Chernobyl, and Fukushima. Such fear does not have any scientific grounds. Empirical evidence suggests that nuclear power is the safest source of reliable energy (Ritchie, 2020; Ritche & Roser, 2020). According to Ritchie (2020) who combined the results of Markandya and

Wilkinson (2007) and Sovacool and colleagues (2015, 2016), the death rate from energy production per terawatt-hour of nuclear energy 0.07, which is mostly death from Chernobyl accidents. The death rate from brown coal is 32.72 and the death rate from gas is 4.63. Notably the death rate from nuclear energy is similar to the death rate from wind (0.04), solar (0.02) and hydropower (0.02). In terms of carbon-neutrality, nuclear power is the cleanest sources of energy. Greenhouse gas emissions per energy production of nuclear power is the lowest (3 tonnes per terawatt-hour) among most all energy sources (Ritchie, 2020; Ritche & Roser, 2020).

Fear without scientific grounds typically leads policy makers and public to overreact to situations and to ignore promising solutions for the situations (Ahn, 2021). Such overreaction often cost lives. Anti-vaccination movements mostly driven by fears of vaccine adverse event resulted in the increase in vaccine-preventable disease outbreaks and epidemics (Dube & MacDonald, 2015; Gangarosa et al., 1998). Fear of low-dose radiation adversely impose excessive costs to the society, leading to unnecessary loss of life (Waddington et al., 2017; Watson, 2020; Yanovskiy et al., 2019).

Ignorance of Ignorance

It is true that unifying science, humanism, and art is our hopes for interdisciplinary problem-solving, and co-minding of six collective acts (co-exposing, co-focusing attention, co-cognizing, co-remembering, co-questioning, and co-imaging) are promising ways for problem-solving. Among six collective acts, co-remembering, co-questioning, and co-cognizing might be the main obstacles of IDR community building due to our ignorance of ignorance and illusion of understanding. People including those who have been trained as academic researchers often do not know what they don't know while they are overconfident about their abilities (e.g., Kruger

& Dunning, 1999). Such illusory overconfidence can be found in applying one's knowledge to the world. Individuals typically feel they understand the world in depth despite their limited knowledge and misleading intuitive epistemology (Dunning, 2011; Rosenblit & Keil, 2002). A typical example is the argument by Beck (1992, p. 22), who has significant influence on academic communities.

Atomic accidents are accidents no more (in the limited sense of the word 'accident'). They outlast generations. The affected even include those not yet alive at the time or in the place where the accident occurred but born years later and long distances away. This means that the calculation of risk as it has been established so far by science and legal institutions collapses. [...] By risks I mean above all radioactivity, which completely evades human perceptive abilities, but also toxins and pollutants in the air, the water and foodstuffs, together with the accompanying short- and long-term effects on plants, animals and people.

Beck's argument, atomic accidents outlast generations, is purely speculation and do not have any scientific grounds. Indeed, after decades of Beck's publication of his book, researchers could find no evidence of a transgenerational effect of radiation exposure to parents after examining genes of more than 200 Chernobyl survivors and their children (Yeager et al., 2021). Beck is not the only researcher from the social domain who ignore their ignorance of research in the physical domain. Scholars who shared Beck's view or cited Beck's false argument on risk and nuclear power did not review any scientific research from the physical domains (e.g., Cottle, 1998).

What's worse is hostile sentiment toward specific discipline especially nuclear science. Hostile sentiment toward nuclear science and industry are represented by the term 'nuclear

mafia,' which refers to corrupt scientists and others who serve the interest of nuclear industry sacrificing human well-being (Choi et al., 2011). A dramatic example of such hostility is \$10 million defamation case by a Stanford professor who sued a critic and a scientific journal (Retraction Watch, 2020 July 9).

Concluding Remarks

Situational problems need to be categorized into physical and social domains, of which cognitive and perceptual processes are fundamentally different. Composing IDR communities can be a sure way of solving problems in the physical domain such as developing atomic bombs, transistor, or cellular telephone systems. In the social domains, however, forming IDR communities might not always be a sure way of solving problems, because problems in the social domains are much more complicated than those in the physical domains. To form IDR communities in the social domains, there are many obstacles such as ignorance of ignorance, illusion of understanding, and rift among academic communities. Further, what we have to realize is that dire problems such as climate change and epidemic or pandemic diseases are those in the social domains not in the physical domains.

The proposed co-minding process of six collective acts for behavioral problem solving might not be enough to be a solution. A question arises how we could make people who are ignorant of their ignorance with overconfidence despite their limited knowledge and misleading intuitive epistemology engage in the co-minding process. It might be intellectual humility that we have to nurture in academic communities. Intellectual humility is defined as "recognizing that a particular personal belief may be fallible, accompanied by an appropriate attentiveness to limitations in the evidentiary basis of that belief and to one's own limitations in obtaining and

evaluating relevant information" (Leary et al., 2017, p. 793). Intellectual humility is typically manifested by open-mindedness, tolerance, and openness to experience (Krumrei-Mancuso & Rouse, 2016). Low intellectual humility often leads an individual to disregard others' different views and to stick to one's own beliefs that may be grounded on false knowledge and/or flawed assumptions.

Thus, to build up an IDR community, it is necessary for us to understand other minds and disciplines. We need to review literature not only from our own domains but also from other domains, and put ourselves in other domain's shoes in a way of intellectual humility.

REFERENCES

- Ahn, D. (2020). Is artificial intelligence social being? *Journal of Communication Research*, 57(3), 155-195.
<https://doi.org/10.22174/jcr.2020.57.3.155>
- Ahn, D. (2021). Phantom risk and ignored hazard: Definition and typology of risk. *Journal of Communication Research*, 58(2), 5-65.
<https://doi.org/10.22174/jcr.2021.58.2.5>
- Allison, W. (2021). *Radiation and reason: The impact of science on a culture of fear* (K. Kang, & Y. Kang, Trans.). Geulmadang. (Original work published 2009)
- Beck, U. (1992). *Risk society: Towards a new modernity* (R. Mark, Trans.). Sage. (Original work published 1986)
- Bryce, R. (2020, April 30). Stanford prof. can't muzzle 'planet of the humans,' must pay defendants' legal fees in SLAPP suit. *Forbes*.
<https://www.forbes.com/sites/robertbryce/2020/04/30/stanford-professor-cant-muzzle-planet-of-the-humans-must-pay-defendants-legal-fees-in-slapp-suit>
- Choi, Y.-Y., Suzuki, A., Lee, S.-H., & Paek, D.-M. (2011). The Fukushima nuclear disaster and

- nuclear safety systems in Korea. *Journal of Environmental Health Sciences*, 37(3), 226-233.
<https://doi.org/10.5668/JEHS.2011.37.3.226>
- Cottle, S. (1998). Ulrich Beck, 'risk society' and the media: A catastrophic view? *European Journal of Communication*, 13(1), 5-32.
<https://doi.org/10.1177/0267323198013001001>
- Dubé, E., Vivion, M., & MacDonald, N. E. (2015). Vaccine hesitancy, vaccine refusal and the anti-vaccine movement: Influence, impact and implications. *Expert Review of Vaccines*, 14(1), 99-117.
<https://doi.org/10.1586/14760584.2015.964212>
- Dunbar, R. I. M. (2009). The social brain hypothesis and its implications for social evolution. *Annals of Human Biology*, 36(5), 562-572.
<https://doi.org/10.1080/03014460902960289>
- Dunning, D. (2011). The Dunning-Kruger effect: On being ignorant of one's own ignorance. In J. M. Olson & M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 44, pp. 247-296). Academic Press.
<https://doi.org/10.1016/B978-0-12-385522-0.00005-6>
- European Medicines Agency (2021, April 7). AstraZeneca's COVID-19 vaccine: EMA finds possible link to very rare cases of unusual blood clots with low blood platelets.
<https://www.ema.europa.eu/en/news/astrazenecas-covid-19-vaccine-ema-finds-possible-link-very-rare-cases-unusual-blood-clots-low-blood>
- Fiske, S. T., & Taylor, S. E. (2013). *Social cognition: From brains to culture*. (2nd ed.). Sage.
- Frith, C. (2013). *Making up the mind: How the brain creates our mental world*. Blackwell Publishing.
- Gangarosa, E. J., Galazka, A. M., Wolfe, C. R., Phillips, L. M., Miller, E., Chen, R. T., & Gangarosa, R. E. (1998). Impact of anti-vaccine movements on pertussis control: The untold story. *The Lancet*, 351(9099), 356-361.
[https://doi.org/10.1016/S0140-6736\(97\)04334-1](https://doi.org/10.1016/S0140-6736(97)04334-1)
- Kim, H.-S. (2012). Climate change, science and community. *Public Understanding of Science*, 21(3), 268-285.
<https://doi.org/10.1177/0963662511421711>
- Kim, H.-S. (2020). Realizing interdisciplinarity among science, humanism, and art: A new paradigmatic explication of community problem solving. *Asian Communication Research*, 17(3), 20-54.
<https://doi.org/10.20879/acr.2020.17.3.20>
- Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121-1134.
<https://doi.org/10.1037//0022-3514.77.6.1121>
- Krumrei-Mancuso, E. J., & Rouse, S. V. (2016). The development and validation of the comprehensive intellectual humility scale. *Journal of Personality Assessment*, 98(2), 209-221.
<https://doi.org/10.1080/00223891.2015.1068174>
- Leary, M. R., Diebels, K. J., Davisson, E. K., Jongman-Sereno, K. P., Isherwood, J. C., Raimi, K. T., Deffler, S. A., & Hoyle, R. H. (2017). Cognitive and interpersonal features of intellectual humility. *Personality and Social Psychology Bulletin*, 43(6), 793-813.
<https://doi.org/10.1177/0146167217697695>
- Lee, D. (2020). *Birth of intelligence: From RNA to artificial intelligence*. (D. Lee, Trans). Oxford University Press. (Original work published 2017)
- Markandya, A., & Wilkinson, P. (2007).

- Electricity generation and health. *The Lancet*, 370(9591), 979-990.
[https://doi.org/10.1016/S0140-6736\(07\)61253-7](https://doi.org/10.1016/S0140-6736(07)61253-7)
- Muthukrishna, M., Doebeli, M., Chudek, M., & Henrich, J. (2018). The cultural brain hypothesis: How culture drives brain expansion, sociality, and life history. *PLoS Computational Biology*, 14(11), e1006504.
<https://doi.org/10.1371/journal.pcbi.1006504>
- New York Times (2020, May). See how vaccinations are going in your country and state. *New York Times*. Retrieved May 13, 2020, from <https://www.nytimes.com/interactive/2020/us/covid-19-vaccine-doses.html>.
- Office of Nuclear Energy. (2021, March 24). *Nuclear power is the most reliable energy source and It's not even close*. United States Department of Energy.
<https://www.energy.gov/ne/articles/nuclear-power-most-reliable-energy-source-and-its-not-even-close>
- Office of Nuclear Energy. (2021, March 31). *3 reasons why nuclear is clean and sustainable*. United States Department of Energy.
<https://www.energy.gov/ne/articles/3-reasons-why-nuclear-clean-and-sustainable>
- Oransky, I. (2020, July 9). Stanford prof ordered to pay legal fees after dropping \$10 million defamation case against another scientist. *Retraction Watch*.
<https://retractionwatch.com/2020/07/09/stanford-prof-ordered-to-pay-legal-fees-after-dropping-10-million-defamation-case-against-another-scientist>
- Ritchie, H., Mathieu, E., Rodés-Guirao, L., Appel, C., Giattino, C., Ortiz-Ospina, E., Hasell, J., Macdonald, B., Beltekian, D., & Roser, M. (2020). Coronavirus Pandemic (COVID-19). *OurWorldInData.org*. Retrieved July 10, 2021, from <https://ourworldindata.org/coronavirus>
- Ritchie, H. (2020, February 10). What are the safest and cleanest sources of energy? *OurWorldInData.org*. Retrieved July 10, 2021, from <https://ourworldindata.org/safest-sources-of-energy>
- Ritchie, H., & Roser, M. (2020). What are the safest sources of energy? *OurWorldInData.org*. Retrieved July 10, 2021, from <https://ourworldindata.org/nuclear-energy#what-are-the-safest-sources-of-energy>
- Rozenblit, L., & Keil, F. (2002). The misunderstood limits of folk science: An illusion of explanatory depth. *Cognitive Science*, 26(5), 521-562.
https://doi.org/10.1207/s15516709cog2605_1
- Sovacool, B. K., Andersen, R., Sorensen, S., Sorensen, K., Tienda, V., Vainorius, A., Schirach, O. M., & Bjorn-Thygesen, F. (2016). Balancing safety with sustainability: Assessing the risk of accidents for modern low-carbon energy systems. *Journal of Cleaner Production*, 112(5), 3952-3965.
<https://doi.org/10.1016/j.jclepro.2015.07.059>
- Sovacool, B. K., Kryman, M., & Laine, E. (2015). Profiling technological failure and disaster in the energy sector: A comparative analysis of historical energy accidents. *Energy*, 90(2), 2016-2027.
<https://doi.org/10.1016/j.energy.2015.07.043>
- Waddington, I., Thomas, P. J., Taylor, R. H., & Vaughan, G. J. (2017). J-value assessment of relocation measures following the nuclear power plant accidents at Chernobyl and Fukushima Daiichi. *Process Safety and Environmental Protection*, 112, 16-49.
<https://doi.org/10.1016/j.psep.2017.03.012>
- Watson, D. (2020, August 12). For the first time, world learns truth about risk of nuclear. *The Kernel*.
<https://medium.com/generation-atomic/for-the-first-time-world-learns-truth-about-risk-of-nuclear-6b7e97d435df>
- Yanovskiy, M., Shaki, Y. Y., & Socol, Y. (2019). Ethics of adoption and use of the linear no-threshold model. *Dose-Response*, 1-3.

<https://doi.org/10.1177/1559325818822602>

Yeager, M., Machiela, M. J., Kothiyal, P., Dean, M., Bodelon, C., Suman, S., Wang, M., Mirabello, L., Nelson, C. W., Zhou, W., Palmer, C., Ballwe, B., Colli, L. M., Freedman, N. D., Dagnall, C., Hutchinson, A., Vij, V., Maruvka, Y., Hatch, M., ... Chanock, S. J. (2021). Lack of transgenerational effects of ionizing radiation exposure from the Chernobyl accident. *Science*, 372(6543), 725-729.
<https://doi.org/10.1126/science.abg2365>