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Exploring the intention of out-of-home activities participation during new normal conditions in Indonesian cities

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ABSTRACT

The present study will be the first to examine the participation intention of physical activities if new normal conditions are implemented in Indonesia. Socio-economic and household factors, spatial characteristics, perception of coronavirus disease (COVID-19), and the virtual activities behaviour during the COVID-19 pandemic were explored to understand the magnitude of respondents' intention to undertake out-of-home activities during new normal conditions. Based on a questionnaire survey, the study, with 834 respondents, was conducted in the middle to the end of May 2020. By applying the ordered logit model, the model results revealed that younger people tend to participate more in maintenance activities of shopping and outside eating and leisure activities of recreation and social. Meanwhile, the factor of gender, income, and education level had no significant impact on participation intention of mandatory, maintenance, and leisure activities. Excluding non-grocery shopping, there was also no significant difference in activity participation intention between people living in the Greater Jakarta as epicentrum of COVID-19 in Indonesia and people living outside the Greater Jakarta. Furthermore, people living in a household with a high number of motorcycle and car ownership had a greater propensity to pursue outside eating activity. The activity behaviour change from physical to virtual activity participation during new normal conditions could not be replaced by the experience of virtual activities, including e-working, e-learning, non-grocery e-shopping, food delivery, and movie streaming during the pandemic. Finally, some policies are proposed to control activity participation during the new normal period to minimise the virus spread in Indonesia.

1. Introduction

After the first case of the coronavirus disease (COVID-19) emerged in Wuhan, China, in early 2020 (Li et al., 2020), the President of Republic of Indonesia announced the first confirmed case of COVID-19 in Indonesia on 2 March 2020 (Djalante et al., 2020). Two people living in Depok, the Greater Jakarta, were positively contracted the COVID-19 (Ministry of Health Republic of Indonesia, 2020a). Eleven days after, the president established the task force for rapid response to COVID-19. This action was then followed by several policies, including the prohibition of mass gathering issued by the national police and the acceleration of socialisation of COVID-19 prevention issued by the Ministry of Communication and Information (AHK Indonesien, 2020). The Greater Jakarta, comprising Jakarta, Bogor, Depok, Tangerang, and Bekasi, was then claimed as the epicentrum of COVID-19 in Indonesia.

To prevent the spread of COVID-19 in Indonesia, most of governors and mayors then enacted a large-scale social restriction policy for their territory. This first policy was employed in the Jakarta Metropolitan Area, the capital city of Indonesia, and was followed by several provinces and cities such as Bogor, Bekasi, and Depok. Until 18 April 2020, the Ministry of Health approved enforcement of large-scale social restriction policy in 18 regions (AHK Indonesien, 2020). The restriction policy is stated in the Minister of Health Regulation No. 9, the Year 2020. This policy comprises the operation and occupation limitation of public transport and private vehicle, school and workplace closure, and the restriction of religious activities, social and cultural activities, and mass gathering in public spaces (Ministry of Health Republic of Indonesia, 2020b). Meanwhile, the other regions keep minimising the spread of COVID-19, such as by socialising the physical distancing to the public, dispersing the crowd in public places, and closing the schools.

Nevertheless, the number of infected people continued to increase. The Ministry of Health recorded that on 15 June 2020, there were 39,294 infected patients with 1017 daily new cases and 2198 deaths (Müller, 2020). The Ministry of Finance reported that Indonesia's economic growth in the period of January to May 2020 was 2.97%, decreased by 41.42% compared with the previous year with the same time frame (Ministry of Finance Republic of Indonesia, 2020). In this situation, the government

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has decided to loosen the large-scale social restriction policy and led to a new normal condition. One of the main reasons for this decision is that this outbreak has negatively affected the decline of the nations' economy.

Consequently, the government has prepared several protocols that must be obeyed by the society if new normal conditions are implemented. For instance, the Ministry of Transportation regulates travel activities of people who want to be out of town especially those via plane flights by requiring them to have a certification stating that they are COVID-19 negative. It is obtained through a polymerase chain reaction test (Ministry of Transportation Republic of Indonesia, 2020). Another example is for Jakarta residents who have responsibilities and must travel out of the city. Those who enter the Jakarta territory due to an emergency matter must secure a permission letter first from the provincial government before entering into or exiting from the Jakarta Metropolitan Area (Jakarta Provincial Government, 2020). The government also must anticipate people's activities during new normal conditions. Because of this, this paper aims to explore factors influencing the person's desire to undertake out-of-home activities during new normal conditions. In this paper, the labels 'new normal condition,' 'after the large-scale social restriction,' and 'after the outbreak' have a similar meaning and are used interchangeably.

Previous studies generally categorised the out-of-home activities into three main groups: (1) mandatory activities including work, work-related, school and school-related; (2) maintenance activities such as grocery shopping, eating, pickup/drop-off children, child care and banking and (3) leisure activities such as recreation and social (Akar et al., 2011; Kang and Scott, 2010; Schwanen et al., 2008). In the present study, we categorised the activities into six groups. The first is working or studying as a mandatory activity. The second and third are grocery shopping (or daily shopping) and eating, respectively, representing maintenance activities. The fourth and fifth are recreation and social, respectively, representing leisure activities. The present study also added the sixth activity, which is non-daily shopping, including buying electronics and clothing. It is in line with the previous study revealing that there is a significant difference in activity participation behaviour between daily and non-daily shopping activity (Dias et al., 2020). The present study is expected to provide an overview of COVID-19 control during the new normal periods for the government in determining the appropriate policies for the Indonesian context.

The next section describes the survey methodology, and explains the survey results. After explaining the proposed model, we discuss model results and conclude with a discussion on policy implications and suggestions for future research.

2. Data collection

We conducted a web-based questionnaire survey between 11 and 28 May 2020. As many as 834 respondents participated in our online survey. However, like all online surveys, there is a possibility that this survey does not perfectly represent Indonesian society. For instance, well-educated people, those living in the regions with easier internet access and younger people are more likely to access this online questionnaire survey. Therefore, a natural limitation of respondent bias by using this web-based approach might exist. We designed a stated preference like survey to examine the activity participation intention on new normal conditions for each purpose and the frequency of virtual activities per week during the COVID-19 pandemic. Other questions such as respondents' characteristics, respondents' household characteristics, and respondents' perceptions of COVID-19 were also asked.

Descriptive statistics for the socio-demographics of the respondents are presented in Table 1. It shows that there were more females than males, with the former accounting for nearly 52% of the total sample. Our respondents' age was generally at the productive ages and had a bachelor's degree or higher. Most of the respondents were full-time workers (45.44%) and students (27.94%). Most of their income was between IDR 2.5 to 5 million (equals to 178 to 357 USD) and less than IDR 2.5 million (less than 178 USD), accounting for 49.88% and 32.61%, respectively. We defined income as an amount of money a person earned every month, such as salary for workers, pocket money for students, and any type of money earned by the non-workers. We also defined the respondent's income at the time of study, where it was around two months after the first confirmed case of COVID-19 in Indonesia. After two months, most of the full-time workers kept their status as workers even they worked from home. Indeed, there were some number of full-time workers who changed to be part-time workers or even had no work. Also, some of the part-time workers were forced to be unemployed. However, this study did not detect the magnitude of the change in income and type of work.

Table 1
Respondent characteristics (n = 834).

Variable	Classification	n	%
Socio-demographics			
Age	<25 years old	279	33.45
	25–40 years old	335	40.17
	>40 years old	220	26.38
Gender	Male	401	48.08
	Female	433	51.92
Education level	High school and lower	151	18.11
	Bachelor's degree	511	61.27
	Master's degree and higher	172	20.62
Income (IDR)[a]	<2.5 million	272	32.61
	2.5–5 million	416	49.88
	5.1–10 million	101	12.11
	>10 million	45	5.40
Type of work	Students	233	27.94
	Full-time workers	379	45.44
	Part-time workers	93	11.15
	No work	129	15.47
Household characteristic			
Number of car ownership	Have no car	272	32.61
	1 car	416	49.88
	≥2 cars	146	17.51
Number of motorcycle ownership	Have no motorcycle	227	27.22
	1 motorcycle	434	52.04
	≥2 motorcycles	173	20.74
Number of a household member	Living alone	88	10.55
	1 people	60	7.08
	2 people	100	11.99
	≥3 people	586	70.38
Spatial characteristic	The Greater Jakarta	259	31.05
	Big cities	372	44.60
	Medium and small cities	203	24.35
Perception of COVID-19	Not serious disease	30	3.60
	Serious disease	375	44.96
	Severe disease	429	51.44

[a] 1 million IDR = 71 USD (21 June 2020).

In terms of household characteristics, most of our respondents had one motorised vehicle at home by 49.88% and 52.04% for car and motorcycle, respectively. Meanwhile, nearly 71% of our respondents are living in a household with three or more family members. Looking into the spatial characteristics, our respondents are from a variety of cities spreading in Indonesia. Most of them are living in the Greater Jakarta and Indonesia's big cities such as Surabaya, Medan, Bandung, Makasar, Semarang, Palembang, and Batam by 31.05% and 44.60%, respectively. The rest (24.35%) are living in medium and small cities, including Yogyakarta, Denpasar, Malang, Pekanbaru, Pontianak, Banjarmasin, and Padang. According to this distribution, we believe our respondents have a good representation of megacity with more than ten million inhabitants, big cities with more than one million inhabitants, and medium and small cities with less than one million inhabitants. Considering their perception of COVID-19, 51.44% and 44.96% of them stated that COVID-19 was a severe and serious disease, respectively, whereas only 3.6% of respondents stated that COVID-19 was not a serious disease.

Apart from socio-demographics, variables of virtual activities during the outbreak are presented in Table 2. E-learning or e-working and movie streaming become the most frequent virtual activities (more than seven times a week) undertaken by the respondents during the outbreak, with around 32% and 42%, respectively. By contrast, grocery and non-grocery e-shopping are the least frequent virtual activity, with over 50% of

Table 2
Virtual activities during COVID-19 pandemic (n = 834).

	e-Learning/e-working (%)	Grocery e-shopping (%)	Non-grocery e-shopping (%)	Food delivery (%)	Movie streaming (%)
Once a week or less	19	29	54	20	6
Twice a week	10	29	24	19	10
Three to four times a week	19	25	13	31	19
Five to six times a week	20	11	6	16	23
More than seven times a week	32	6	3	14	42

respondents do it twice a week or less. For food delivery, 31% of respondents use this service during the outbreak for 3–4 times per week.

The dependent variables for the present study are presented in Table 3. Those are six categories of activity participation intention during new normal conditions. As revealed by the survey results, more than half of respondents intend to participate in both grocery and non-grocery shopping with the same activity frequency before the pandemic occurs. Meanwhile, 44% of respondents expect to be back at work and study with the same frequency activities before the outbreak. By contrast, more than 40% of respondents keep reducing eating outside activities and recreational activities during new normal conditions. In terms of social activities, the trip intention distribution of respondents who will visit their relatives tend to be equally distributed.

3. Method and model

The study employed the ordered logit model to reveal the effect of socio-demographic, perception toward COVID-19, and virtual activities during the outbreak on the trip intention during new normal conditions. The method is employed because the dependent variable is ordinal. The dependent variable was defined on three-point scales from −1 'for less than usual,' 0 for 'the same as usual,' and 1 for 'more than usual.' Since we defined that there were six types of activities, six ordinal logit models were developed. The utility function (U) for each model is defined as follows:

$$U_v = \sum_{n=1}^{7} \alpha_n . X_{Rn} + \sum_{n=1}^{3} \beta_n . X_{Hn} + \sum_{n=1}^{2} \theta_n . X_{Sn} + \gamma . X_D + \delta . X_{Ev} + \varepsilon \quad \text{with } v = 1, \ldots, 5 \quad (1)$$

$$U_6 = \sum_{n=1}^{7} \alpha_n . X_{Rn} + \sum_{n=1}^{3} \beta_n . X_{Hn} + \sum_{n=1}^{2} \theta_n . X_{Sn} + \gamma . X_D + \varepsilon \quad (2)$$

where U_1 to U_5 represents the utility function for working/studying, grocery shopping, non-grocery shopping, eating, and recreational activity, respectively, and U_6 represents the utility function for social activity. X_{Rn} represents independent variables of individual characteristics comprising continuous variables of age (X_{R1}), gender (X_{R2}), education level (X_{R3}), income (X_{R4}), and dummy variables of students (X_{R5}), full-time workers (X_{R6}) and part-time workers (X_{R7}). Meanwhile, non-workers were determined as the reference category for the dummy variable of the type of work. X_{Hn} represents independent variables of household characteristics consisting of continuous variables of the number of car ownership (X_{H1}), number of motorcycle ownership (X_{H2}), and number of family members per household (X_{H3}). X_{Sn} represents independent variables of spatial characteristics consisting of dummy variables of people living in Indonesia's big cities (X_{S1}) and medium and small cities (X_{S2}), where people living in the Greater Jakarta were determined as the reference category. X_D denotes the perception of how dangerous COVID19 is (ranging from very dangerous to ordinary). X_{Ev} represents independent variables of virtual activity frequency per week during the outbreak consisting of e-learning or e-working (X_{E1}), grocery e-shopping (X_{E2}), non-grocery e-shopping (X_{E3}), food delivery (X_{E4}) and movie streaming (X_{E5}). Parameters of α_n, β_n, θ_n, γ, and δ represent the estimated parameters, and ε is a random error term. Note that for variable X_{Ev}, shown in Table 2, we only incorporated virtual activity variables that are relevant to the model. For example, e-learning/e-working virtual activity corresponds with working/studying during new normal. We had tried to incorporate all virtual activity variables on all models. However, the model fit became worse than the model with only one relevant variable. Therefore, we only used the relevant virtual activities for each model.

The measurement model, that is, the likelihood to trip more or less during new normal conditions (y), was calculated using Eq. (3), where τ_1 and τ_2 are thresholds to be estimated.

$$y = \begin{cases} -1 \text{ (for less than usual), if } U \le \tau_1 \\ 0 \text{ (for same as usual), if } \tau_1 < U \le \tau_2 \\ 1 \text{ (for more than usual), if } \tau_2 < U \end{cases} \quad (3)$$

The probability that y takes level j ($P(y = j)$) for each alternative is given by Eq. (4), where F is the cumulative distribution function of logistic distribution.

$$P(y = j) = F(\tau_j - U) - F(\tau_{j-1} - U) \quad (4)$$

The model was run in the PythonBiogeme (Bierlaire and Fetiarison, 2009), and the maximum likelihood was used as an estimation approach for the ordered logit model.

4. Results

The impacts of socio-demographic, spatial and household characteristics, perception of COVID-19, and virtual activities behaviour during the outbreak on the intention of activity participation for each type of activity are shown in Table 4. Generally, coefficient estimates had the expected signs and significance at the 90% confidence or more. For the goodness-of-fit values, the value of AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) of the six final models were less than 1836.622 and 1907.515, respectively. It indicates that the proposed model is good, as suggested by Ben-Akiva and Lerman (1985). We prefer to have a model where only associated virtual activity during the pandemic is estimated rather than have a model with all virtual activities during the pandemic are estimated. Moreover, the analysis treats individuals' physical activity intention during new normal as a reference. The analysis did not use household physical activity intention as the basis of analysis.

The model results revealed that gender, education level, and income did not affect the participation of all types of activities during new normal

Table 3
Out-of-home activity participation intention during new normal conditions (n = 834).

	Working/studying (%)	Grocery shopping (%)	Non-grocery shopping (%)	Eating (%)	Recreation (%)	Social (%)
Less than usual	27	30	38	43	41	32
Same as usual	44	52	51	33	28	34
More than usual	29	18	11	24	31	34

Table 4
Model estimation.

	Working/studying	Grocery shopping	Non-grocery shopping	Eating	Recreation	Social
Socio-demographics						
Age		−0.191(−1.80)***	−0.316 (−2.91)*	−0.421 (−3.97)*	−0.318 (−3.10)*	−0.560 (−5.31)*
Gender						
Education level						
Income						
Students[a]						
Full-time workers[a]						
Part-time workers[a]	0.479 (1.71)***					
Household characteristics						
No. of cars				0.146 (1.66)***		
No. of motorcycles		0.238 (2.75)*		0.153 (1.84)***		
No. of family members						
Spatial characteristic						
Big cities[b]			−0.427 (−1.67)***			
Medium and small cities[b]						
Perception of COVID-19		0.205 (1.73)***				
Virtual activities during the outbreak						
e-Learning/e-working	0.109 (2.25)**	N/A	N/A	N/A	N/A	N/A
Grocery e-shopping	N/A		N/A	N/A	N/A	N/A
Non-grocery e-shopping	N/A	N/A	0.292 (4.43)*	N/A	N/A	N/A
Fresh food delivery	N/A	N/A	N/A	0.107 (2.10)**	N/A	N/A
Movies streaming	N/A	N/A	N/A	N/A	1.25 (2.37)**	N/A
Threshold						
$A1]\tau_1$	−0.650	−0.089	−0.499	−0.058	−0.351	−0.991
τ_2	1.290	2.301	2.251	1.442	1.119	0.219
Statistics						
No. of data	834	834	834	834	834	834
No. of estimated parameters	16	16	16	16	16	15
Rho-square	0.149	0.231	0.353	0.225	0.148	0.143
Final log-likelihood	−884.965	−833.895	−764.09	−870.812	−903.311	−880.021
AIC	1799.929	1697.790	1558.179	1771.624	1836.622	1788.041
BIC	1870.823	1768.684	1629.073	1842.518	1907.515	1854.209

[a] Means non-workers are a reference category.
[b] Means the Greater Jakarta is a reference category.
* Means $p < 0.01$.
** Means $0.01 \le p < 0.05$.
*** Means $0.05 \le p < 0.1$; values in parentheses are *t*-test values; empty cells mean p ≥ 0.1; N/A means a variable is not considered in the model.

conditions. Meanwhile, the age factor had a negative correlation with all physical activities participation, excluding mandatory activity of work and study. A negative sign of age coefficients revealed that younger people were more likely to undertake leisure activities of recreation and social and maintenance activities of shopping and eating during new normal conditions. Furthermore, compared with non-workers such as retired people and housewives, part-time workers had a higher propensity to engage in work activities during new normal conditions.

As for household characteristics, the model results showed that households with a higher motorcycle ownership level had a significant positive impact on grocery shopping and outside eating activities. It means that people living in a household with lots of motorcycles tend to undertake more those activities during new normal conditions. Meanwhile, the more the households own cars, the more their members participate in outside eating activities. In terms of spatial characteristics, the model results revealed that it did not correlate with all physical activities, except on non-grocery shopping. It represents that people living outside the Greater Jakarta, which is known as the epicenter of COVID-19 in Indonesia, have a similar intention to participate in out-of-home activities with inhabitants in the Greater Jakarta after the large-scale social restriction. Meanwhile, a negative correlation occurs between people in Indonesian big cities and non-grocery shopping activities. It means that people living in Surabaya, Medan, Bandung, Makasar, Semarang, Palembang, and Batam have a lower participation intention on non-grocery shopping activities than those living in the Greater Jakarta during new normal conditions.

Considering the effect of virtual activities experience during the outbreak on the activity participation intention after large-scale social restriction, we found that the experience of online non-grocery shopping during the pandemic influenced an increase in in-store non-grocery shopping during new normal conditions. By contrast, grocery e-shopping during the outbreak are not associated with in-store grocery shopping after the outbreak. E-shopping experience during the pandemic could not be a stimulant for shopping behaviour change from in-store to online shopping during new normal conditions. Hence, it appears that in-store shopping has retained its popularity, which provides not only facilitation of biological needs but also the needs of social interactions (Mokhtarian, 2004). Similar to non-grocery shopping, a positive effect of virtual activities also occurs in the mandatory activity of work and study, maintenance activity of eating, and leisure activity of recreation. It shows that the more often people undertake those related-virtual activities during the COVID-19 pandemic, the higher the probability for them to participate in those physical activities during the new normal period. It reveals that although ICT (Information and Communication Technology) use might replace physical mobility during the outbreak (De Vos, 2020), it cannot substitute the physical activities if new normal conditions are implemented. Similar findings are revealed by De Haas et al. (2020), showing that participation change from physical to virtual activities in the Netherlands occurs during the outbreak only.

Lastly, the perception of COVID-19 as a severe acute respiratory syndrome decreased the tendency of grocery shopping only. Other activities related to severity perceptions had no significant results. This finding implies the understanding of respondents regarding the risk of virus spreading. The activity of grocery shopping seems to have a higher risk since many people will gather in one place and interact closely with each other with minimal distancing. Respondents perceived this as high

risk. Meanwhile, other activities were perceived as a lower risk since it is easier to manage for distancing and protection. It is interesting to know the mechanism between how people will protect themselves and make a relation with the risk of the virus spreading related to the type and location of activities.

5. Conclusions and policy recommendations

Since the Indonesian government has planned to implement new normal conditions, the present study aims to reveal whether society, especially living in cities, has a strong intention to participate in out-of-home activity after the COVID-19 pandemics. By employing the ordered logit model, the study investigated the factors influencing the activity participation intention of working and studying, shopping, eating, recreation, and social activities during new normal conditions. We found that workers with more e-working frequency during the outbreak tended to travel more to their workplace during new normal conditions. Meanwhile, younger people were more likely to participate in maintenance and leisure activities after the outbreak. E-shopping also significantly influenced the participation in in-store non-grocery shopping but not in grocery shopping activities. Grocery shopping activities were more influenced by the people's perception of COVID-19 and the number of motorcycle ownership in a household. Lastly, younger people, people living in the household with a high number of motorcycle and car ownership, and people with a high frequency of fresh food online shopping during the pandemic were more likely to participate in the outside eating activity during new normal conditions.

On the basis of our findings, the present study provides three main policies for the government to suppress the spread of COVID-19, especially in Indonesian cities. First, the government needs to anticipate the activity participation intention during new normal conditions. Although our survey result shows that more than 95% of respondents perceive COVID-19 as a serious and severe disease, our model result reveals that there is no relationship between perception of COVID-19 and all activity participation intention on new normal conditions, except on grocery shopping. It means that even though we know that most of our respondents still perceive COVID as dangerous, our model cannot show the relationship between COVID perception and physical activity during new normal. Due to this, the government needs to continue restricting some activities engagement, which has a high potential for COVID-19 transmission on the period of new normal such as eating inside a restaurant, watching at the cinema, participating in a mass gathering, and seeing friends inside. Moreover, since COVID-19 perception significantly influences an intention to do grocery shopping during new normal, the government also needs to ensure the safety of people during grocery shopping. Second, the government needs to regulate the operational time and health protocol for places where young people often gather to do maintenance and leisure activities such as cafes, restaurants, malls, and movie theaters. The model result explores that younger people had a stronger desire to engage in maintenance and leisure activities after the outbreak. Third, more encouragement for adaptation of virtual activities during new normal conditions must be carried out by the government because the model result shows that the virtual activities during the outbreak increase the physical activities after the outbreak. Providing an incentive for people who continue engaging activities from home can be carried out by the government to attract more society to minimise out-of-home activity participation after the COVID-19 pandemics. The incentive policies include reducing taxes for offices that scheduling employees for shift work, supporting the food vendors to provide a takeaway service, and collaborating with motorcycle-based ride-hailing companies as a food delivery service partner (Irawan et al., 2020a, 2020b).

Several limitations can be addressed for future study. First, future work may use the sample that represents more variety of locations in Indonesia to enrich the understanding of how people behave in different geographical locations. The survey method and sample bias correction process also must be carefully executed. Second, involving other activity behaviour variables, such as the effect of travel mode choice and activity time duration, may produce a better activity participation prediction model and a wider range of policy recommendations. For example, the behaviour characteristics of public transport use in the Greater Jakarta, which is very different from other cities in Indonesia (Bastarianto et al., 2019), can enrich to formulate the local policies of public transport use after the large-scale social restriction situation. Also, incorporating the travelled distance for each trip purpose may provide a better representation to understand the impact of both vehicle ownership and travel mode choice on the intention of activity participation during new normal conditions. Third, since the present study found that ICT use experienced during the COVID-19 pandemic significantly influenced the physical activities after the outbreak, the future study can focus more on optimising ICT use during new normal conditions.

CRediT authorship contribution statement

Muhammad Zudhy Irawan: Conceptualization, Methodology, Software, Formal analysis, Writing - original draft. **Muhamad Rizki:** Conceptualization, Data curation, Writing - review & editing. **Tri Basuki Joewono:** Conceptualization, Writing - review & editing. **Prawira Fajarindra Belgiawan:** Conceptualization, Formal analysis, Writing - review & editing.

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