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# **Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator**

## **Abstract**

The COVID-19 pandemic has an impact on the behavior of public transport users and raises concerns about the means of transportation. Therefore, this study aims to explain the mediating effect of environmental concern on the relationship between five personality traits on the intention to use Bus Rapid Transit (BRT) during the pandemic. A correlational survey of 425 participants was conducted, and the analysis found that all personality traits did not directly predict the intention to use BRT. Furthermore, there was a positive mediating effect at the weak level of environmental concern on the relationship between the four personality traits (Agreeableness, Conscientiousness, Extraversion, and Openness to experience) towards the intention to use BRT. The results showed that the mediating effect of environmental concern was not significant for the relationship between Neuroticism and BRT usage intentions. It was reported that one of the reasons people use public transportation is due to an environmental concern during a pandemic.

**Keyword:** big five personalities, environmental concern, intention, bus rapid transit, pandemic

## **1. Introduction**

The COVID-19 pandemic has reduced the usage frequency of all transportation modes (Barbieri et al., 2021), by up to 90% (Przybylowski et al., 2021; Sahraei et al., 2021; Tirachini & Cats, 2020). Based on this condition, it is important to understand the behavior of public transportation during the pandemic. Several studies explain the desire to pay (Awad-Núñez et al., 2021), safety, and comfort (Przybylowski et al., 2021), as well as behavior to maintain health protocols (Dzisi & Dei, 2020; Guellich et al., 2021). Currently, there is a need to explain the behavior of using public transportation during the COVID-19 pandemic (see Irawan et al., 2020), especially on personal factors such as personality.

There are still limited studies on travel behavior using public transportation during the COVID-19 pandemic in association with personality factors. The general personality concept studied in the context of behavior using public transportation is the "big five" personality (Costa & McCrae, 2011). Furthermore, Asselmann et al. (2020) found a significant positive relationship between Agreeableness on the reduction in the use of public transportation during the first week of the pandemic in Germany, while other traits were not significantly correlated. Another study conducted by Krupic et al. (2020) proved a positive relationship between Agreeableness and a negative

relationship Extraversion with restrictions on the use of public transportation in Croatia, while other traits were not significantly correlated. In contrast to Asselmann et al. (2020) and Krupic et al. (2020) which examines the relationship between personality traits and restrictions on the use of public transportation in pandemic era, we investigate the factors that might increase the use of public transport in a pandemic situation.

Under non-pandemic conditions, many studies explain the role of personality factors in public transportation behavior (Abraham & Wirayudha, 2015; Anagnostopoulou et al., 2020; Gao et al., 2017; Roos et al., 2020; Yazdanpanah & Hosseinlou, 2017). Some previous findings have contradictory results on the relationship between personality traits and intention to use public transportation. For example, Extraversion had a negative relationship (Roos et al., 2020), but Yazdanpanah and Hosseinlou (2017) found a positive relationship of extraversion with intention to use public transportation. Contradictory results also found on the Conscientious trait, Abraham and Wirayudha (2015) and Roos et al. (2020) revealed a negative association of Conscientiousness and intention to use public transportation. Conversely, conscientious individuals more often use public transportation at lower prices (Yazdanpanah & Hosseinlou, 2016). From the literature review, we also note inconsistent findings between the relationship between personality traits and intentions to use public transportation. Openness to Experience (Roos et al., 2020), Agreeableness (Roos et al., 2020; Stachl et al., 2017), and Neuroticism (Yazdanpanah & Hosseinlou, 2017) had a significant correlation with intention to use public transportation. On the other hand, research in Indonesia found that these three traits did not significantly predict the intention to use public transportation (Abraham & Wirayudha, 2015). Several inconsistent finding of the relationship between personality traits and the intention to use public transportation has the potential to need new explanations. I argue that environmental concern plays an important role in the relationship between personality traits and intention to use BRT. This study aims to provide answers regarding the mediation effect of environmental concern on the relationship between personality factors and the intention to use BRT during the COVID-19 pandemic.

### **1.1. Personality Traits**

The factor theory of the Big Five Personality is a structure of differences designed to explain individual development and functioning (McCrae, 2010). The five personality domains are called personality traits, namely (Costa & McCrae, 2011): (1) Extraversion: characterized by openness, easy closeness with others, active, happiness to socialize, optimistic, fun, affectionate, and friendly; (2) Agreeableness: characterized by gentle, kind, helpful, always open and loving to others, very trustworthy, easy to be deceived; (3) Conscientiousness: have a strong stance, well-organized ability, orderly, credible and diligent; (4) Neuroticism: characterized by uncontrolled anxiety, increased anger levels, feelings of unease, often sad and not easy to get along with; (5) Openness

to experiences: characterized by high curiosity, creative, confident, imaginative, and always updating new things.

Roos et al. (2020) found that the personality trait dimensions of Openness to Experience and Agreeableness had a positive relationship with the use of public transportation. Furthermore, conscientiousness and Extraversion had a negative relationship with the use of public transportation, while Neuroticism had no significant relationship (Roos et al., 2020). Stachl et al. (2017) found that agreeable people used public transportation applications more often in smartphone. For users of public transportation in Jakarta, Conscientiousness is the only personality dimension negatively significant associated with the intention of using public transportation, and the other four traits are not significant (Abraham & Wirayudha, 2015). Another study found a significant negative relationship between Neuroticism and the intention to use public transportation, while Extraversion was positively related to the intention (Yazdanpanah & Hosseinlou, 2017).

Based on the study of the Big Five Personality theory and related scientific findings, the following hypotheses were proposed: Openness to experience, agreeableness, and Extraversion are positively correlated with intention to use BRT; Neuroticism and Conscientiousness are negatively correlated with intention to use BRT in the COVID-19 pandemic.

## **1.2. Environmental concern**

Personality was found to be an important factor in determining environmental concerns (Chen et al., 2020). In addition, several studies have found a positive relationship between Neuroticism, Conscientiousness (Abdollahi et al., 2017; Hirsh, 2010), Agreeableness (Hirsh, 2010, 2014), Openness to experience (Milfont & Sibley, 2012; Wuertz, 2015), and Extraversion (Abdollahi et al., 2017) on environmental concerns. Also, it was hypothesized that Openness to Experience, Agreeableness, Conscientiousness, Neuroticism, and Extraversion are positively correlated with environmental concern.

Environmental concern is an antecedent of pro-environmental behavior related to the choice of transportation mode (Bouscasse et al., 2018; Daziano & Bolduc, 2013; Heath & Gifford, 2002; Ng & Phung, 2020), and people with low concerns will tend to choose private transportation modes (Bouscasse et al., 2018). Donald et al. (2014) found that environmental concern was not significantly related to the intention to use private and public transportation. In different types of transportation modes, He et al. (2018); Shalender and Sharma (2021) found that there is a relationship between environmental concern and the desire to use electric vehicles as a form of sustainable car transportation.

There is the positive mediating effect of environmental concern on certain personality traits (e.g. Openness to experience and Agreeableness) on pro-

environmental behavior (Busic-Sontic et al., 2017). Environmental concern was also negatively mediate Extraversion and positively mediate Neuroticism associated with green investment behavior (Busic-Sontic & Brick, 2018). Poier (2021) found the mediating effect of environmental concern on the relationship between Openness to Experience, Agreeableness, and Neuroticism on the adoption of solar energy in households.

Busic-Sontic et al. (2017); Busic-Sontic and Brick (2018); Poier (2021) have similarities in describing examples of pro-environmental behavior, such as the use of public transportation. Pro-environmental behavior allows people to achieve explicit goals for environmental benefits by doing something (Steg & de Groot, 2019). Based on this explanation, it is hypothesized: There is a positive relationship between environmental concern and the intention to use BRT. Furthermore, environmental concern mediates the effects of Agreeableness, Neuroticism, Conscientiousness, Openness to experience, and Extraversion on the intention to use BRT during the COVID-19 pandemic.

### **1.3. Current Research**

Currently, one of the most popular types of public transportation in the Province of South Kalimantan is the Bus Rapid Transit (BRT) 'Banjarbakula'. BRT is a pioneer of modern public transportation with 11 buses and more than 37 bus stops since 2019 on the Banjarmasin-Banjarbaru city route (Subayu, 2020). The lack of studies on public transportation behavior during the pandemic makes this important. Several studies of public transportation behavior in Indonesia during pre-pandemic period explained user dissatisfaction (Joewono et al., 2016), intentions to use public transportation (Abraham & Wirayudha, 2015), the choice of use of transportation modes (Bastarianto et al., 2019; Van et al., 2014), and the performance of public bus drivers (Suraji et al., 2017). Only Abraham and Wirayudha (2015) explain personal factors in the form of personality on the intention to use public transportation in Jakarta. Therefore, this current study focuses on the intention to use public transportation during the pandemic. Furthermore, it explains the personality factors mediated by environmental concern on the intention to use Banjarbakula BRT. It consists of intention to use public transportation on pandemic; big five traits; and environmental concern as an outcome, predictor, and mediator variables respectively (see Figure 1).

*[Figure 1 about here]*

## **2. Methods**

### **2.1. Participants**

An online correlational survey was conducted on 19-26 March 2021, and data were collected using surveymonkey.com on 425 participants (Mean

age=19,770, SD=1,635, range=17-31). The majority were women (75.8%), currently attending school/college (90.6%), living in urban areas (81.9%), and never using Banjarbakula BRT before (64.5%). A total of 89.7% live in two cities that are passed by the Banjarbakula BRT service line, namely Banjarmasin and Banjarbaru. Meanwhile, 10.4% live in Martapura City closest to BRT services, and these three cities are located in South Kalimantan Province, Indonesia.

## **2.2. Measures**

### **2.2.1. Dependent variable**

Participants' intention to use the Banjarbakula Bus Rapid Transit (BRT) during a pandemic was measured using two items with a correlation value of  $r=.641$ ,  $p<.001$ . An example of an item statement is "During the covid-19 pandemic, I intend to use the Banjarbakula BRT transportation to go to work or study places/services and shopping centers/recreational places at another time". The answer choices for this measuring instrument are 1=Strongly disagree to 4=Strongly agree.

### **2.2.2. Independent variable**

All measuring instruments in the independent variables have the same response responses: 1=Strongly disagree to 4=strongly agree. The independent variable measuring instruments are:

***Environmental Concern.*** This study adapted the New Ecological Paradigm scale (NEP-15, Dunlap et al., 2000), and the translation was conducted by adopting the instrument from Beaton et al. (2000) to Indonesian. Furthermore, two items that have correlation values with a low total score were eliminated. This affected the quality of reliability, and in total there were 13 statement items with good reliability,  $\alpha = .742$ . An example item is "when the things that are happening now continue, a major ecological disaster will be faced".

***Big Five Personality.*** This measuring instrument consists of personality traits Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness to experience. The study uses Indonesian version of the Big Five Inventory (BFI) of 28 items from Ramdhani (2012) adapted from John and Srivastava (1999). Among the five personality traits, a statement item was eliminated because the quality was less equal. Agreeableness consists of six valid items out of a total of seven items with reliability  $\alpha = .664$ , for example, the item "I am a forgiving person". Conscientiousness consists of six items with reliability  $\alpha = .727$ , for example, the item "I am a reliable worker". Extraversion consists of five items with reliability  $\alpha = .749$ , for example, the item "I am an enthusiastic person". Neuroticism consists of four items with reliability  $\alpha = .781$ , for example, the item "I am a moody person". Openness to experience consists of six items with

reliability  $\alpha = .712$ , for example, the item "I am a person who often gets new ideas". The average reliability value of the five personality traits is  $\alpha = .723$ .

### 2.2.3. Control variable

Five control variables were determined including concerns about public transportation, age, gender, place of residence, and ever/never using BRT before. Before mediation model analysis, the variables that need to be controlled based on the results of the bivariate correlation test should be checked.

**Concern about using public transportation.** This study asked a statement item about "The Covid-19 pandemic makes me anxious to take public transportation". Responses 1=strongly disagree to 4=strongly agree.

**Demographic factors.** This study asked several demographic factors, namely age, gender (1=male, 2=female), place of residence (1=Urban, 0=Rural), whether they had taken BRT before (PT User: 1=user, 0=not users).

### 2.3. Statistical analysis

Before conducting statistical analysis, it is necessary to check the quality of the data first. There is a missing value  $< 1\%$  of all items in all measuring instruments, and intervention was rendered using expectation maximization (EM). Furthermore, data analysis started with the bivariate correlation of all variables. To answer the hypothesis, the mediation regression model was performed using PROCESS macro in SPSS with 1,000 bootstrapping (Model 4, Hayes, 2018). Analysis of the mediation regression model has conducted 5 models according to 5 personality traits. It also controls the covariate variables that are shown to affect the regression results. The covariate variables were determined from the results of the significant bivariate correlation test.

## 3. Result

In the bivariate correlation test, concerned with using PT in the pandemic were negatively correlated to the intention to use BRT ( $r = -.210, p < .01$ ). This formed the control for the variable in the regression analysis of the mediation model. Among the independent variables measured (see table 1), two were weakly correlated to the intention to use BRT in a pandemic, namely environmental concern ( $r = .140, p < .01$ ) and Extraversion ( $r = .114, p < .05$ ).

*[Table 1 about here]*

In the regression analysis of the mediation model, five models were tested according to the number of independent variables of five personality traits. The mediator variable in this analysis is an environmental concern. Meanwhile, the dependent variable is the intention to use PT in a pandemic. The results of the complete analysis can be seen in table 2.



The five models showed that Agreeableness ( $\beta=.286$ ,  $SE=.037$ ,  $t(424)=6.212$ ,  $p<.001$ ), Conscientiousness ( $\beta=.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ), Extraversion ( $\beta=.198$ ,  $SE=.029$ ,  $t(424)=4.226$ ,  $p<.001$ ), and Openness to experience ( $\beta=.254$ ,  $SE=.036$ ,  $t(424)=5.504$ ,  $p<.001$ ) significantly predicts environmental concern but not Neuroticism ( $\beta=.018$ ,  $SE=.027$ ,  $t(424)=.377$ ,  $p=n.s.$ ). The five models also found that environmental concern significantly predicted positive intentions to use BRT (see table 2 for detailed results).

In the results of the mediation model 1 test, environmental concern significantly mediates the relationship between Agreeableness and the intention to use BRT ( $\beta=.056$ ,  $p<.05$ ,  $BootSE=.018$ ,  $BootCI$  95% [.021, .093]). Similarly, model 2 showed that environmental concern significantly mediates the relationship between Conscientiousness and the intention to use BRT ( $\beta=.041$ ,  $p<.05$ ,  $BootSE=.016$ ,  $BootCI$  95% [.012, .075]). The previous model also found a significant mediating effect of environmental concern on the relationship between Extraversion and BRT use intentions in Model 3 ( $\beta=.033$ ,  $p<.05$ ,  $BootSE=.014$ ,  $BootCI$  95% [.010, .067]). It mediates the significant relationship between Openness to experience and the intention to use BRT in model 5 ( $\beta=.043$ ,  $p<.05$ ,  $BootSE=.017$ ,  $BootCI$  95% [.012, .079]). All mediation effects in models 1, 2, 3, and 5 are full positive mediation because the results of the analysis showed that the direct effect (coefficient value  $c$ ) from the independent to the dependent variable is not significant (see table 2). Meanwhile, there is no significant mediating effect of environmental concern on the relationship between Neuroticism and the intention to use BRT ( $\beta=.033$ ,  $p=n.s.$ ,  $BootSE=.010$ ,  $BootCI$  95% [-.016, .024]).

A significant negative effect was also found from the control variable of the concern of using BRT during a pandemic in model 1 ( $\beta=-.243$ ,  $SE=.051$ ,  $t(424)=-5.092$ ,  $p<.001$ ), model 2 ( $\beta=-.248$ ,  $SE=.051$ ,  $t(424)=-5.212$ ,  $p<.001$ ), model 3 ( $\beta=-.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ), model 4 ( $\beta=-.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ), and model 5 ( $\beta=-.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ). Therefore, the concern effect of using BRT can reduce the intention to use BRT in a Pandemic. The right decision was made to control this using a covariate variable in the mediation regression model analysis.

[Table 2 about here]

#### 4. Discussion

The five personality traits were not significantly related to the intention to use BRT during the pandemic. On the total effect, there was a significant partial relationship of Conscientiousness, Extraversion, and Openness to experience on the intention to use BRT without involving mediator variables in the regression estimation. Agreeableness, Conscientiousness, Extraversion, and Openness to experience are partially related to

environmental concerns. However, Neuroticism is not significantly related, and across all models, environmental concern was significantly related to the intention to use BRT during the COVID-19 pandemic. An important finding was the proven effect of environmental concern mediation. The main hypothesis, environmental concern significantly mediates the relationship between personality traits of Openness to Experience, Agreeableness, conscientiousness, and Extraversion (except Neuroticism) with intention to use BRT, and the four indirect effects are at a weak regression coefficient level. This result is supported by the average score of the BRT usage intention variable which is at a low level (mean score=2.331 from 1-4 of scale) (see table 1).

The pandemic has both positive and negative impacts on the environment. One of the positive impacts is the restriction of transportation activities to reduce noise and air pollution (Rume & Islam, 2020). The pandemic affects the environment (Zambrano-Monserrate et al., 2020), and the lockdown that reduced mobility increase air quality rates in several countries (Muhammad et al., 2020; Sahraei et al., 2021). Furthermore, the pandemic situation increased environmental awareness (Ali et al., 2021; Severo et al., 2021). The survey results of Kachaner et al. (2020) of 3,000 people from several countries found that 70% of participants became more concerned with the environment than before the pandemic. In addition, 76% of participants thought that environmental issues were as worrying (or more worrying) as health problems during the COVID-19 pandemic (Kachaner et al., 2020). The findings explain that anxiety has a strong effect on reducing the intention to use BRT during a pandemic (significant effect from the control variable). The pandemic condition also makes the effect of environmental concern to be significant on the intention to use public transportation.

#### **4.1. Personality, environmental concern, and intention to use BRT**

During the pandemic, agreeableness was not significantly related to the intention to use BRT (indirect and total effect) which is in line with the study conducted by Abraham and Wirayudha (2015). It was reported that people with high scores on Agreeableness choose to use BRT when there is an environmental concern effect as a mediator. The use of public transportation can be classified as pro-environmental behavior. The findings of the mediating effect are in line with the study of Basic-Sontic et al. (2017) and Poier (2021). One of the characteristics of agreeableness is altruistic and warm or called empathetic concern (Hirsh, 2010; Swami et al., 2010). Furthermore, altruism seems to be directed at others (Graziano & Habashi, 2010; Oda et al., 2014) and the environment (Schultz, 2001). It is believed that when a pandemic occurs, Agreeable people need concern and altruism on environmental issues to decide on the use of public transportation. This is because one of the goals of using public transportation is to reduce the impact of air pollution or maintain environmental quality.

Conscientiousness did not directly affect the intention to use BRT, but the coefficient of total effect (without involving the mediator variable) was significant. Previous studies found a negative relationship between conscientiousness and the

intention to use public transportation (Abraham & Wirayudha, 2015; Roos et al., 2020). Furthermore, the results showed that environmental concern positively mediated the relationship between Conscientiousness and intention to use BRT. One of the most common domains is orderliness which includes the tendency of people to emphasize tidiness, cleanliness, and planning (Roberts et al., 2014). Furthermore, conscientious people have a “future time perspective” planning (Przepiorka et al., 2020) and responsibilities (Roberts et al., 2014). This study assesses the mediating effect of environmental concern because people with high Conscientiousness perceive environmental conditions as a realistic plan and they feel the need to be responsible by using public transportation. Moreover, people feel more concerned and responsible for environmental sustainability during pandemic situations (see Ali et al., 2021; Severo et al., 2021).

My study did not obtain a direct effect of extraversion on the intention to use BRT, but the coefficient of total effect (without involving a mediator) found a significant relationship. The results showed that environmental concern positively mediates the relationship between extraversion and intention, but at a weak effect level, and one of the facets is sociability (John, 2021). People with high Extraversion scores tend to rate the impact of air pollution on human health (Hirsh, 2014). It is suspected that environmental concerns arise due to awareness of the negative impacts related to air pollution. Furthermore, it makes people with high Extroversion choose to use public transportation, and this decision will certainly provide social benefits to others' health.

Openness to experience does not have a direct relationship with the intention to use BRT. However, there is a significant total effect between this trait and intention when it does not involve the mediator variable. People with the Openness to experience personality type want to use BRT in a pandemic when environmental concerns have a significant effect as a mediator. In the context of pro-environmental behavior, the findings of the mediating effect are in line with Busic-Sontic et al. (2017) and Poier (2021). The characteristics of Openness to experience are high curiosity (Costa & McCrae, 2011) and aesthetics related to nature (Silvia et al., 2015). These two traits made people with high openness to improve their experience and evaluate their environment. Meanwhile, they become interested in using public transportation as a form of action to reduce the negative impact on nature after gaining knowledge on environmental conditions.

There was an insignificant relationship from Neuroticism to the intention to use BRT during the pandemic (indirect effect and total effect) in line with the findings of Roos et al. (2020). However, this contrasts with Matz & Harari (2020) study, where a positive relationship with the desire to spend time in transit was obtained (vehicle). This personality trait did not significantly predict intention through the mediating effect of environmental concern. During a pandemic, the need for safety and comfort becomes an important factor that determines the use of public transportation (Awad-Núñez et al.,

2021; Przybylowski et al., 2021). Furthermore, the COVID-19 pandemic has made people with high neuroticism scores prefer to practice social distancing (Ludeke et al., 2021). However, it is difficult to keep social distance on public transport full of passengers. Closer contact increases the risk of exposure to the virus (Yezli & Khan, 2020), and this concern reduces the desire to use public transportation (Chang et al., 2021). For people with the Neuroticism personality type, using public transportation is a scary thing.

#### **4.2. Limitations and Future Directions**

This study is limited by only explaining environmental concerns and personality traits. The environmental concern factor has a weak effect both as a predictor and a mediator. This is because other possible factors affect the desire to use public transportation during the COVID-19 pandemic. Furthermore, it was limited to only a relatively new location using modern public transportation, the Bus Rapid Transit Banjarbakula as my context study which started operating in 2019. Locations with long and established use of public transportation should be considered. The future researcher should examine the other public transportation modes include commuter trains, light rail transit, mass rapid transit, airplane, and ferry.

#### **5. Conclusions**

Personality traits did not directly predict the intention to use BRT during the COVID-19. Environmental concern was found to be positively related to intention. There was a full positive mediating effect on the relationship between 4 personality traits (Agreeableness, Conscientiousness, Extraversion, and Openness to experience) on intentions to use BRT. Meanwhile, environmental concern was not found to significantly mediate the effects of Neuroticism and the intention to use BRT. The use of public transportation is a concern of all parties related to environmental and public health problems. During a pandemic, environmental concerns is important, because the use of public transportation will have a positive impact on improving air quality which will indirectly have an impact on public health. The findings provide advice on local policies related to public transportation (Irawan et al., 2020). This includes promoting the use of public transportation by observing strict health protocols and information about positive impacts on the environment.

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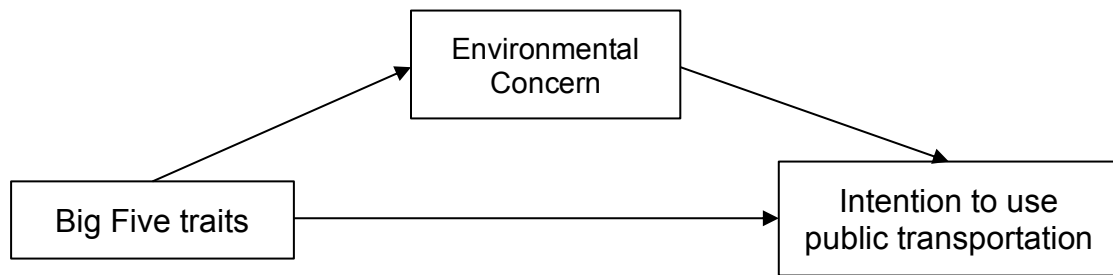
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**Figure 1. The analytical model framework to examine the mediating effect of environmental concern on the relationship between big five personalities and intention to use BRT**

Table 1. Bivariate correlation variables

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	19.77	1.635	-	-.150**	.091	.366**	-.064	.072	-.021	.093	.044	-.229**	.053	.080
2. Gender	-	-		-	.048	.053	.129**	-.030	.036	-.011	.005	.109*	.016	-.012
3. Residence	.819	.386			-	.145**	.021	.021	.047	.135**	.106*	-.086	.074	-.032
4. BRT User	-	-				-	-.078	.050	-.035	.076	.029	-.079	.057	.095
5. Concern to use PT in Pandemic	3.379	.641					-	.188**	.107*	.108*	.052	.134**	.043	-.210**
6. Environmental Concern	3.190	.309						-	.303**	.256**	.207**	.043	.262**	.140**
7. Agreeableness	3.160	.381							-	.449**	.433**	-.107*	.335**	.002
8. Conscientiousness	2.910	.405								-	.502**	-.238**	.485**	.08
9. Extraversion	2.850	.503									-	-.308**	.439**	.114*
10. Neuroticism	2.890	.543										-	-.018	-.065
11. Openness to experience	2.930	.392											-	.095
12. Intention to use BRT in pandemic	2.331	.680												-

Note. Gender: 1=male, 2=female; Residence: 1=Urban, 0=Rural; PT User: 1=user, 0=not user; \*\* p< .01; \* p < .05.

Table 2. Mediation analysis result of intention to use Public Transportation (Y)

	Path coefficients ( $\beta$ )				Indirect effect	
	Path a (X→M)	Path b (M→Y)	Path c (Total eff.)	Path c' (Direct eff.)	Estimates ( $\beta$ )	Confidence Interval 95% of $\beta$ (Bootstrapping)
<b>Model 1 (R<sup>2</sup>=.078, F(3, 421)=11.901, p&lt;.001)</b>						
Agreeableness (X)	.286(.037)***		.025(.085)	-.031(.088)		
Environmental concern (M)		.195(.011)***				
A → EC → IUPT					.056(.018)*	.021, .093
<b>Model 2 (R<sup>2</sup>=.081, F(3, 421)=12.366, p&lt;.001)</b>						
Conscientiousness (X)	.239(.036)***		.104(.080)*	.063(.081)		
Environmental concern (M)		.171(.108)**				
C → EC → IUPT					.041(.016)*	.012, .075
<b>Model 3 (R<sup>2</sup>=.085, F(3, 421)=13.099, p&lt;.001)</b>						
Extraversion (X)	.198(.029)***		.125(.064)**	.092(.065)		
Environmental concern (M)		.167(.107)**				
E → EC → IUPT					.033(.014)*	.010, 0.67
<b>Model 4 (R<sup>2</sup>=.079, F(3, 421)=12.039, p&lt;.001)</b>						
Neuroticism (X)	.018(.027)		-.048(.060)	-.041(.059)		
Environmental concern (M)		.187(.105)***				
N → EC → IUPT					.003(.010)	-.016, .024
<b>Model 5 (R<sup>2</sup>=.081, F(3, 421)=12.322, p&lt;.001)</b>						
Openness to experience (X)	.254(.036)***		.104(.082)*	.060(.084)		
Environmental concern (M)		.170(.108)**				
O → EC → IUPT					.043(.017)*	.012, 0.79

Notes: A=Agreeableness, C= Conscientiousness, E= Extraversion, N= Neuroticism, O= Openness to experience, EC= Environmental Concern, IUPT= Intention to Use Public transportation, coefficients regression= standardized coefficient, \*p< .05, \*\*p< .01, \*\*\* p<.001.

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**MS #1136 - Psychological Research on Urban Society**

1 message

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**Debora Eflina Purba** <editor-proust-1136-3719224@dcuischolarhub.bepress.com>Sun, Apr 30, 2023 at  
9:29 AM

To: =?UTF-8?Q?=22Muhammad\_Abdan\_Shadiqi=22?= &lt;abdan.shadiqi@ulm.ac.id&gt;

Cc: The Authors &lt;authors-proust-1136@dcuischolarhub.bepress.com&gt;, The Editors &lt;editors-proust-1136@dcuischolarhub.bepress.com&gt;

Dear Dr. Muhammad Abdan Shadiqi,

I have received two reviews on your manuscript entitled "Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator" shows considerable promise. I agree with both reviewers that your manuscript cannot be accepted in its current form, but we believe that with certain changes we may be able to accept your submission.

I enclose the reviewers' comments below for your perusal, or you can go directly to the following page to see the reviews:

<https://scholarhub.ui.ac.id/cgi/preview.cgi?article=1136&context=proust>

Please address each comment from the reviewers and attach a response letter that refer to the revised manuscript accordingly. To submit a revision, please use the Revise Submission link on that page.

Thank you,

Debora Eflina Purba  
Editor

Psychological Research on Urban Society

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**Reviewer 1:**

Dear Author, I have read your manuscript with great interest as the selected topic is very relevant and important. I believe studies conducted during the pandemic period, such as yours, will further refine the boundary conditions of previous knowledge. Your investigation on the mediating effect of environmental concern on the Big Five personality towards intention to use public transportation is of relevance. To this end, please find the following comments and questions:

1. In the Introduction paragraph 1, you stated that "Currently, there is a need to explain the behavior of using public transportation during the COVID-19 pandemic (see Irawan et al., 2020), especially on personal factors such as personality". However, I failed to see the reason why there is such a need and in particular why you are focusing on personality trait? Does COVID-19 have impacted behaviour differently for people with different personality? At this phase of the manuscript, you have not indicated this.

2. In the Introduction paragraph 2, you stated that "In contrast to... we investigate the factors that might increase the use of public transport in a pandemic situation". Are you suggesting that previous studies are merely correlational, while yours attempt to find a causal relationship? Shouldn't the distinguishing factor in your research be the mediating effect of environmental concern instead?

3. In the Introduction paragraph 3, you show how previous research contradict each other, but I think that instead of contradiction, it is a matter of different conditions.

4. In the Introduction paragraph 3 in the last two sentences, you suddenly environmental concern for the first time, and I feel this has not been fully explained. Furthermore, the argument for having a mediation relationship has not been argued as well. I believe explanations will be important before such a claim.

5. Prior to Section 1.1. Personality Traits, I think it is best to also refer to your variable of interest (i.e., intention to use public transportation) before moving towards each of explanatory variables and the mediator.

6. Section 1.1. Personality Traits paragraph 2, you reviewed the literature, but differently from before you did not state any contradicting findings here. This is rather puzzling for me.

7. Section 1.3. Current Research. I would want to know the reason for studying this in South Kalimantan. Is there any specific characteristics that makes this study interesting and relevant for other cities or provinces?

8. Section 2.1. Participants. It seemed that most of the participants have not used the service. Wouldn't this effect

your results?

9. Section 2.2.1. Dependent Variable. I am rather confused with the measure as the statement suggest "During covid-19 pandemic..", while also stating "at another time". Does the measure refer to covid-19 period or period of intention after covid?

10. Section 2.2.2. Independent variables. You are using 4-pt scale. However, can you explain whether Environmental Concern and the Big Five Personality Traits are measured in 4-pt scale as well. If not, why do you choose to adapt it?

11. Section 2.2.3. Control Variable. The measure for Concern about using public transportation seem to be a reverse way of explaining intention to use. Would not this impact your result since the control variable is included in your model?

12. Section 3 Results. I would suggest that at the end of the section to show the results in a conceptual model to make it easier for reader to have a summary of the findings.

13. General comments. I feel that the manuscript will benefit from having another round of editing to clarify some sentences which are rather confusing at the moment.

I hope these comments will help you further improve your manuscript.

~~~~~

Reviewer #2:

This study is intended to explain the mediating effect of environmental concern on the relationship between five personality traits on the intention to use Bus Rapid Transit (BRT) during the pandemic. This paper is interesting, however, in its current condition, has several issues that need to be addressed by the authors as follows:

#### Abstract

- The introduction part should be more elaborated to explain the urgency for conducting the study, including the variables of the study.
- The method should be explained in more detailed, the study design, instruments, how the data was collected (e.g., online questionnaire).
- In the result the author should explain what kind of statistical analysis that be used.
- The implication of the study should be explain in more detailed.

#### Introduction

- In the first paragraph, the author should give more explanation why we should consider the personal factor, i.e., personality, in the behavior of using public transportation. Please explain in more detailed the gap factors that were found from the previous study before choosing personality as the main predictor of the behavior in public transport.
- The author explained some studies that were conducted previously in the pandemic and non-pandemic situation. Please add more analysis what is the similarities and differences that were found related to the relationship between personality and intention to use public transportation. If there were any difference, the author should explain why it is different. Then, the author should also explain from the previous studies, the relationship between personality factors and intention to use public transportation is direct or indirect. In many studies related to driving behavior, personality always plays as the distal variable, and the relationship between personality and risky driving always indirect, mediated by attitude, risk perception (see Wong et al., 2010). Therefore, explain in more detail the rationale to have the assumption that the relationship between personality and intention to use public transportation is indirect and involving mediator variable. The ending part of introduction is quite jumping because no explanation to include environmental concern as the mediator.

- 1.1. Personality factors □ please explain in more detailed why there were differences between studies abroad and in Jakarta, and when all the studies were conducted (in the pandemic or non-pandemic situation). It is important so the reader can follow the rationale for the hypothesis.

- 1.2. Environmental concern □ please explain how the author define environmental concern and how it will mediate the relationship between personality and intention to use public transportation. The explanation should be more integrated so the readers can understand how the environmental concern serve as the mediator.

- 1.3. Current research

--> based on the previous study in Jakarta (see Abraham and Wirayudha, 2015), please explain the difference between the current study and the previous. This is important to show the theoretical contribution that this study will add from the previous studies.

--> please explain in more detailed the traffic condition in the Province of South Kalimantan, especially the Bus Rapid Transit (BRT) 'Banjarbakula', how this BRT is different with public transportation in other cities in Indonesia, and what is the main problem of the user of BRT. The author should also explain the reason to conduct the study in South Kalimantan and how it can generalize to other cities in Indonesia.

#### Method

- The majority of participants never using BRT (64.5%), please explain how this characteristic will have the effect on the results. This issue should be included in the limitation
- Change the subsection "2.2.1 Dependent Variable" to "2.2.1. Intention to use BRT", also "2.2.2. Independent Variable" to "2.2.2. Environmental Concern and 2.2.3. Big Five Personality"
- Response for each measure should be explain separately --> for 2.2.2 and 2.2.3
- Information about the average reliability for all personality traits are not needed, because it is not common to calculate the average reliability coefficient. A better information is the range of reliability coefficient from all the personality traits.

### Results

- In Table 1, there is a significant correlation between Concern to use PT in Pandemic and intention to use BRT. How this correlation will effect on the main analysis. Please add more explanation in detail concerning this result, because in the method section author did not explain the urgency to ask participant about concern to use PT in Pandemic.

### Discussion

- Please do not use sub section in the discussion.
- The discussion should be described in more systematic ways. For example, the author should explain why this study found no correlation between each personality factor and intention to used BRT, but there is a significant correlation between environmental concern and intention to use BRT. This result should be discussed in more detail.
- In the statement “The findings explain that anxiety has a strong effect on reducing the intention to use BRT during a pandemic (significant effect from the control variable). The pandemic condition also makes the effect of environmental concern to be significant on the intention to use public transportation.” Please add more theory that could explain this result.
- The first sentence in the limitation is not a limitation. The author should add another limitation related to methodology and practical implication. One limitation can be explained is related to the validity of the study.
- The practical implication is still vague and not related to the variable of this study. Please revise in a clearer ways.

### General

- Throughout the paper, please use “we” and “our” rather than “I” and “my”



Muhammad Abdan Shadiqi <[abdan.shadiqi@ulm.ac.id](mailto:abdan.shadiqi@ulm.ac.id)>

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**MS #1136: Update submitted for "Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator"**

1 message

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**Editors of Psychological Research on Urban Society** <[editors-proust-1136@dcuischolarhub.bepress.com](mailto:editors-proust-1136@dcuischolarhub.bepress.com)>Mon, Aug 7, 2023 at  
8:19 PMTo: "\"Muhammad Abdan Shadiqi\"" <[abdan.shadiqi@ulm.ac.id](mailto:abdan.shadiqi@ulm.ac.id)>Cc: The Authors <[authors-proust-1136@dcuischolarhub.bepress.com](mailto:authors-proust-1136@dcuischolarhub.bepress.com)>, Assigned Editor <[editor-proust-1136@dcuischolarhub.bepress.com](mailto:editor-proust-1136@dcuischolarhub.bepress.com)>

This is an automatically-generated note to inform you that "Muhammad Abdan Shadiqi" <[abdan.shadiqi@ulm.ac.id](mailto:abdan.shadiqi@ulm.ac.id)> has submitted an update to MS #1136, "Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator," in Psychological Research on Urban Society.

The reason for update is:  
major revision

The changes made are:  
Previously, a major revision was invited. This is that major revision.

The authors are:  
"Muhammad Abdan Shadiqi" <[abdan.shadiqi@ulm.ac.id](mailto:abdan.shadiqi@ulm.ac.id)>

A preview of the title page and status may be viewed at:  
<https://scholarhub.ui.ac.id/cgi/preview.cgi?article=1136&context=proust>

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Editors can access the tools to manage this submission at:

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Thank you,

The Editors

Psychological Research on Urban Society

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Response to Reviewer 1

Title: Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19:  
The role of environmental concern as a mediator

Code: #1136

Date of review: April 30, 2023

Date of revision: August 7, 2023

Note for editor: All revision with highlight green in manuscript.

| Comment Reviewer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Response Author                                                                                                                                                                                                                                                                                                                                                               |
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| <p>Reviewer 1:<br/>Dear Author, I have read your manuscript with great interest as the selected topic is very relevant and important. I believe studies conducted during the pandemic period, such as yours, will further refine the boundary conditions of previous knowledge. Your investigation on the mediating effect of environmental concern on the Big Five personality towards intention to use public transportation is of relevance. To this end, please find the following comments and questions:</p>                          | <p>Thank you.</p>                                                                                                                                                                                                                                                                                                                                                             |
| <p>1. In the Introduction paragraph 1, you stated that “Currently, there is a need to explain the behavior of using public transportation during the COVID-19 pandemic (see Irawan et al., 2020), especially on personal factors such as personality”. However, I failed to see the reason why there is such a need and in particular why you are focusing on personality trait? Does COVID-19 have impacted behaviour differently for people with different personality? At this phase of the manuscript, you have not indicated this.</p> | <p>We are adding a sentence to answer your question as follows:<br/><br/>The meta-analysis study of Zettler et al. (2022) found that differences in personality traits have varying effects on personal perception, behavioral adjustment, and societal evaluation.</p>                                                                                                       |
| <p>2. In the Introduction paragraph 2, you stated that “In contrast to... we investigate the factors that might increase the use of public transport in a pandemic situation”. Are you suggesting that previous studies are merely correlational, while yours attempt to find a causal relationship? Shouldn’t the distinguishing factor in your research be the mediating effect of environmental concern instead?</p>                                                                                                                     | <p>We revised to:<br/><br/>In contrast to Asselmann et al. (2020) and Krupic et al. (2020) which examines the relationship between personality traits and restrictions on the use of public transportation in pandemic era, we investigate the factors that might mediate the relation between personality trait and the use of public transport in a pandemic situation.</p> |

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| <p>3. In the Introduction paragraph 3, you show how previous research contradict each other, but I think that instead of contradiction, it is a matter of different conditions.</p>                                                                                                                                                | <p>In all the research we reviewed in the paragraph, the relationship between the two variables was studied under the same condition, which is the non-pandemic period. The classification regarding this has been mentioned in the first sentence “Under non-pandemic conditions, many studies explain the role of personality factors in public transportation behavior....”</p> <p>Therefore, we did not make any changes to this comment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>4. In the Introduction paragraph 3 in the last two sentences, you suddenly environmental concern for the first time, and I feel this has not been fully explained. Furthermore, the argument for having a mediation relationship has not been argued as well. I believe explanations will be important before such a claim.</p> | <p>I added some sentences on the last paragraph in the Introduction.</p> <p>Shadiqi et al. (2023) found that besides from comfort and accessibility of public transportation, environmental concern predicted the use of public transportation. It is difficult to find previous findings that test the mediating effect of environmental concern on the relationship between personality and public transportation use in pandemic situation. Environmental concern was strongly related to attitudes toward the environment (Ibrahim et al., 2021). Attitudes toward the environment mediated the relationship between personality character and responsible environmental behavior-related waste (Ojedokun, 2011). There was a study by Busic-Sontic et al. (2017) that examines the mediating effect of environmental concern on the relationship between big five personality and pro-environmental behavior during non-pandemic period. I believe that the relationship patterns, as identified by Ojedukon (2011) and Busic-Sontic et al. (2017), can apply to the use of public transportation. This is likely because, firstly, one form of pro-environmental behavior is the use of public transportation (Chan et al., 2023); and secondly, the pandemic Covid-19 conditions can increase environmental concerns (Severo et al., 2021).</p> |
| <p>5. Prior to Section 1.1. Personality Traits, I think it is best to also refer to your variable of interest (i.e., intention to use public transportation) before moving towards each</p>                                                                                                                                        | <p>I added a paragraph to explain this.</p> <p>In this study, I focus on explaining the use of public transportation. The availability of</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| <p>of explanatory variables and the mediator.</p>                                                                                                                                                                                   | <p>public transportation is one characteristic of sustainable urbanization (Zhang, 2016). Urban communities use public transportation for their daily mobility, and this behavior is part of pro-environmental behavior (Ertz et al., 2016). Public transportation, as a sustainable mode of transportation, becomes a solution to reduce energy consumption and environmental pollution (Lejda et al., 2017). In addition to its environmental benefits, public transportation is also a solution to reduce the use of private transportation, which is prone to traffic accidents, such as motorbike mode in Indonesia (Soehodho, 2017). In this article, I examine the determinant factors that make someone use public transportation, specifically bus rapid transit (BRT). One of the factors is personality.</p> <p>I choose the big five personality as the main predictor in this study.</p> |
| <p>6. Section 1.1. Personality Traits paragraph 2, you reviewed the literature, but differently from before you did not state any contradicting findings here. This is rather puzzling for me.</p>                                  | <p>In this section, I plan to justify findings that are consistent and strengthen the argument that certain personality types may be associated with, while others may not be associated with, the use of public transportation. Meanwhile, contradictory results are the basis for me to re-examine the relationship between personality and the use of public transportation. This section has been explained in the third paragraph of the introduction.</p> <p>Therefore, we did not make any changes to this comment.</p>                                                                                                                                                                                                                                                                                                                                                                        |
| <p>7. Section 1.3. Current Research. I would want to know the reason for studying this in South Kalimantan. Is there any specific characteristics that makes this study interesting and relevant for other cities or provinces?</p> | <p>I added this sentence on the 1.3:</p> <p>This study was conducted in South Kalimantan, because after relying on conventional urban transportation such as "angkot" or public minivan for a long time, the South Kalimantan government finally developed modern public transportation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>8. Section 2.1. Participants. It seemed that most of the participants have not used the service. Wouldn't this effect your results?</p>                                                                                          | <p>The data on the ever or never use of the BRT has been previously does not affect the results. I have proven this in a bivariate correlation test. I have added an explanation about this in the results of the correlation test.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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| <p>9. Section 2.2.1. Dependent Variable. I am rather confused with the measure as the statement suggest “During covid-19 pandemic..”, while also stating “at another time”. Does the measure refer to covid-19 period or period of intention after covid?</p> | <p>I intended to ask participants to rate their willingness to "use back or again" on another occasion during the pandemic.</p> <p>So, I revise the measurement statement. “During the covid-19 pandemic, I intend to use the Banjarbakula BRT transportation <b>again</b> to go to work or study places/services and shopping centers/recreational places”</p> <p>Before this statement appeared, participants read the following instructions:</p> <p>"At this time, the condition of the Covid-19 pandemic has not been revoked either by the Indonesian Government or WHO. The following questions relate to the condition of the pandemic. How do you agree with some of the following statements..."</p> |
| <p>10. Section 2.2.2. Independent variables. You are using 4-pt scale. However, can you explain whether Environmental Concern and the Big Five Personality Traits are measured in 4-pt scale as well. If not, why do you choose to adapt it?</p>              | <p>All measurments use a 4-point scale. I added information about it in the measurement section.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>11. Section 2.2.3. Control Variable. The measure for Concern about using public transportation seem to be a reverse way of explaining intention to use. Would not this impact your result since the control variable is included in your model?</p>        | <p>Yes, that's right, in the mediation regression model, I included the concern about using public transportation score as the control variable, because in the correlation test results, this variable is significantly correlated to the intention to use BRT (see the first part of the research results).</p>                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>12. Section 3 Results. I would suggest that at the end of the section to show the results in a conceptual model to make it easier for reader to have a summary of the findings.</p>                                                                        | <p>I think through Table 2, the pattern of variable relationships is easy to understand because there are details of the reported regression coefficients. To accommodate the reviewer's suggestion, I decided to add the conceptual model in appendix.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>13. General comments. I feel that the manuscript will benefit from having another round of editing to clarify some sentences which are rather confusing at the moment.</p>                                                                                 | <p>Thanks for your comment, I’m sorry for my limitations in English.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>I hope these comments will help you further improve your manuscript.</p>                                                                                                                                                                                   | <p>Thank you for the comments.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Response to Reviewer 2

Title: Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19:  
The role of environmental concern as a mediator

Code: #1136

Date of review: April 30, 2023

Date of revision: May, 2023

Note for editor: All revision with highlight **green** in manuscript.

| Comment Reviewer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Response Author                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Reviewer 2:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>This study is intended to explain the mediating effect of environmental concern on the relationship between five personality traits on the intention to use Bus Rapid Transit (BRT) during the pandemic. This paper is interesting, however, in its current condition, has several issues that need to be addressed by the authors as follows:</p>                                                                                                                                                                                                                                                                                                                                                                               | <p>Thank you for the comments.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>Introduction</p> <ul style="list-style-type: none"> <li>In the first paragraph, the author should give more explanation why we should consider the personal factor, i.e., personality, in the behavior of using public transportation. Please explain in more detailed the gap factors that were found from the previous study before choosing personality as the main predictor of the behavior in public transport.</li> </ul>                                                                                                                                                                                                                                                                                                 | <p>I added some new sentences on the last the Introduction section to response this comment.</p> <p>... Shadiqi et al. (2023) found that besides from comfort and accessibility of public transportation, environmental concern predicted the use of public transportation. It is difficult to find previous findings that test the mediating effect of environmental concern on the relationship between personality and public transportation use...</p>                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>The author explained some studies that were conducted previously in the pandemic and non-pandemic situation. Please add more analysis what is the similarities and differences that were found related to the relationship between personality and intention to use public transportation. If there were any difference, the author should explain why it is different. Then, the author should also explain from the previous studies, the relationship between personality factors and intention to use public transportation is direct or indirect. In many studies related to driving behavior, personality always plays as the distal variable, and the relationship between</li> </ul> | <p>I added the new explanation to response this comment on the last paragraph in the Introduction:</p> <p>Environmental concern was strongly related to attitudes toward the environment (Ibrahim et al., 2021). Attitudes toward the environment mediated the relationship between personality character and responsible environmental behavior-related waste (Ojedokun, 2011). There was a study by Busic-Sontic et al. (2017) that examines the mediating effect of environmental concern on the relationship between big five personality and pro-environmental behavior during non-pandemic period. I</p> |

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| <p>personality and risky driving always indirect, mediated by attitude, risk perception (see Wong et al., 2010). Therefore, explain in more detail the rational to have the assumption that the relationship between personality and intention to use public transportation is indirect and involving mediator variable. The ending part of introduction is quite jumping because no explanation to include environmental concern as the mediator.</p> | <p>believe that the relationship patterns, as identified by Ojedukon (2011) and Basic-Sontic et al. (2017), can apply to the use of public transportation. This is likely because, firstly, one form of pro-environmental behavior is the use of public transportation (Chan et al., 2023); and secondly, the pandemic Covid-19 conditions can increase environmental concerns (Severo et al., 2021).</p>                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>• 1.1. Personality factors --&gt; please explain in more detailed why there were differences between studies abroad and in Jakarta, and when all the studies were conducted (in the pandemic or non-pandemic situation). It is important so the reader can follow the rationale for the hypothesis.</p>                                                                                                                                             | <p>I added the information about literature review in this section.</p> <p>No research has been conducted to examine how personality traits relate to the use of public transportation during the Covid-19 pandemic. This section provides a review of studies that were carried out before the pandemic.</p> <p>I mentioned the time and location of the previous research in every review I do.</p>                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>• 1.2. Environmental concern ◊ please explain how the author define environmental concern and how it will mediate the relationship between personality and intention to use public transportation. The explanation should be more integrated so the readers can understand how the environmental concern serve as the mediator.</p>                                                                                                                 | <p>I defined the environmental concern. Environmental concern is a person's attitude towards the specific attitude or broader of general environment attitude or environmental value orientations (Cruz &amp; Manata, 2020; Fransson &amp; Gärling, 1999).</p> <p>I added some sentences to explain the pattern of relationship variables.</p> <p>I argue that environmental concern has an effect as a mediator based on research that relationship between personality traits and pro-environmental behavior. Pro-environmental behavior allows people to achieve explicit goals for environmental benefits by doing something (Steg &amp; de Groot, 2019), .....</p> <p>.....</p> <p>One of example pro-environmental behavior on private sphere is the use of public transportation (Ertz et al., 2016).</p> |
| <p>• 1.3. Current research --&gt; based on the previous study in Jakarta (see Abraham and Wirayudha, 2015), please explain the</p>                                                                                                                                                                                                                                                                                                                     | <p>--&gt; Apart from this research being carried out in non-pandemic periods, this research</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



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| <p>difference between the current study and the previous. This is important to show the theoretical contribution that this study will add from the previous studies.</p> <p>--&gt; please explain in more detailed the traffic condition in the Province of South Kalimantan, especially the Bus Rapid Transit (BRT) 'Banjarbakula', how this BRT is different with public transportation in other cities in Indonesia, and what is the main problem of the user of BRT. The author should also explain the reason to conduct the study in South Kalimantan and how it can generalize to other cities in Indonesia.</p> | <p>was also conducted in cities that have good public transportation. So, I revised to this sentence:<br/> Only Abraham and Wirayudha (2015) explain personal factors in the form of personality on the intention to use public transportation in Jakarta as city with well-developed public transportation systems in Indonesia.</p> <p>--&gt; I added the new information about the reason to conduct the study in this province. This study was conducted in South Kalimantan, because after relying on conventional urban transportation such as "angkot" or public minivan for a long time, the South Kalimantan government finally developed modern public transportation.</p> <p>...</p> <p>Therefore, this current study focuses on the intention to use public transportation during the pandemic especially in places that are developing modern transportation modes, such as in South Kalimantan.</p> |
| <p>Method</p> <ul style="list-style-type: none"> <li>• The majority of participants never using BRT (64.5%), please explain how this characteristic will have the effect on the results. This issue should be included in the limitation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     | <p>I analyze the ever/never use of BRT in bivariate regression to determine if this variable has an effect on the regression model. The results show that this variable is not related to the intention to use BRT. I added an explanation in the analysis results as follows:</p> <p>I found other control variables such as age, gender, place of residence, and ever/never using BRT before, are not related to the intention to use BRT. Therefore, these variables are not included in the regression model as control variables.</p>                                                                                                                                                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>• Change the subsection “2.2.1 Dependent Variable” to “2.2.1. Intention to use BRT”, also “2.2.2. Independent Variable” to “2.2.2. Environmental Concern and 2.2.3. Big Five Personality”</li> </ul>                                                                                                                                                                                                                                                                                                                                                                             | <p>Thank you, I have made the changes according to this suggestion.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>• Response for each measure should be explain separately --&gt; for 2.2.2 and 2.2.3</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Thank you, I have made the changes according to this suggestion.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



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| <ul style="list-style-type: none"> <li>Information about the average reliability for all personality traits are not needed, because it is not common to calculate the average reliability coefficient. A better information is the range of reliability coefficient from all the personality traits.</li> </ul>                                                                                                               | <p>I revised adhere this comment:</p> <p>The <b>range</b> reliability value of the five personality traits <b>from <math>\alpha = .664</math> to <math>.781</math></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Results</p> <ul style="list-style-type: none"> <li>In Table 1, there is a significant correlation between Concern to use PT in Pandemic and intention to use BRT. How this correlation will effect on the main analysis. Please add more explanation in detail concerning this result, because in the method section author did not explain the urgency to ask participant about concern to use PT in Pandemic.</li> </ul> | <p>I included the score concerned with using PT in the pandemic as a covariate variable in the regression model. This explanation has been provided in the results section, as follows:</p> <p>In the regression analysis of the mediation model, five models were tested according to the number of independent variables of five personality traits. The mediator variable in this analysis is an environmental concern. Meanwhile, the dependent variable is the intention to use PT in a pandemic. <b>I set the score of concerned with using PT in the pandemic as covariate variable in regression model.</b> The results of the complete analysis can be seen in table 2.</p> |
| <p>Discussion</p> <ul style="list-style-type: none"> <li>Please do not use sub section in the discussion.</li> </ul>                                                                                                                                                                                                                                                                                                          | <p>I deleted the sub section title.</p> <p><b><del>4.1. PERSONALITY, ENVIRONMENTAL CONCERN, AND INTENTION TO USE BRT</del></b></p> <p><b><del>4.2. LIMITATIONS AND FUTURE DIRECTIONS</del></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>The discussion should be described in more systematic ways. For example, the author should explain why this study found no correlation between each personality factor and intention to used BRT, but there is a significant correlation between environmental concern and intention to use BRT. This result should be discussed in more detail.</li> </ul>                            | <p>I have revised the discussion section to make it more systematic, starting with clarifying the findings, discussing the patterns of the insignificant relationship between personality-intention to use BRT, discussing the patterns of the relationship between environmental concern-intention to use BRT, and the mediating effect. In the end, I wrote down the limitations.</p> <p>See the revision in the paragraph 2, 4, and the last paragraph.</p>                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>In the statement “The findings explain that anxiety has a strong effect on reducing the intention to use BRT during a pandemic (significant effect from the control variable). The pandemic condition also</li> </ul>                                                                                                                                                                  | <p>I added two sentences:</p> <p>The findings explain that anxiety has a strong effect on reducing the intention to use BRT during a pandemic (significant</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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| <p>makes the effect of environmental concern to be significant on the intention to use public transportation.“ Please add more theory that could explain this result.</p>                                                                                                         | <p>effect from the control variable). The state anxiety during the pandemic reduces the sense of security in public transportation (Dong et al., 2021), there is a tendency for public transportation users to develop generalized anxiety disorder as a response to the pandemic situation (Kassaw &amp; Pandey, 2022).</p> <p>I moved the “The pandemic condition also makes the effect of environmental concern to be significant on the intention to use public transportation.” in the middle of the paragraph.</p> |
| <ul style="list-style-type: none"> <li>• The first sentence in the limitation is not a limitation. The author should add another limitation related to methodology and practical implication. One limitation can be explained is related to the validity of the study.</li> </ul> | <p>We deleted the first sentence: <del>This study is limited by only explaining environmental concerns and personality traits.</del></p> <p>We added some sentences:<br/> My research is limited to using a correlational survey approach, so it cannot generate causal explanations and has weaknesses in internal validity (Gravetter &amp; Forzano, 2018). Therefore, I suggest that future researchers use experimental methods.</p>                                                                                 |
| <ul style="list-style-type: none"> <li>• The practical implication is still vague and not related to the variable of this study. Please revise in a clearer ways.</li> </ul>                                                                                                      | <p>We revised and added these sentences:</p> <p>This includes promoting the use of public transportation by observing the information about positive impacts on the environment. In particular, people with neurotic personality traits may not have a concern for the environment which can increase their intention to use public transportation, alternatively, safety systems need to be improved.</p>                                                                                                               |
| <ul style="list-style-type: none"> <li>• Throughout the paper, please use “we” and “our” rather than “I” and “my”</li> </ul>                                                                                                                                                      | <p>I decided to use “I” and “my” because I’m a single author.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Original Research Paper

# **Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator**

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## **CONFLICT OF INTEREST**

The authors declared no conflict of interest associated in this study.

## **FUNDING**

This work was supported by LPPM of Universitas Lambung Mangkurat, which has provided a 2021 Research Lecturer Grant (PDWM) for this research [grant number: 697/UN8/PG/2021].

## **DATA AVAILABILITY STATEMENT**

The dataset analyzed for this study can be found in the Open Science Foundation repository: [https://osf.io/cnq43/?view\\_only=1cc52a4cdba0412e8e1e86fd45f4c120](https://osf.io/cnq43/?view_only=1cc52a4cdba0412e8e1e86fd45f4c120)

## **INFORMED CONSENT STATEMENT**

Informed consent was obtained from all individual participants involved in the study.

## **ACKNOWLEDGEMENTS**

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## **Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator**

### **Abstract**

The COVID-19 pandemic has an impact on the behavior of public transport users and raises concerns about the means of transportation. Therefore, this study aims to explain the mediating effect of environmental concern on the relationship between five personality traits on the intention to use Bus Rapid Transit (BRT) during the pandemic. A correlational survey of 425 participants was conducted, and the analysis found that all personality traits did not directly predict the intention to use BRT. Furthermore, there was a positive mediating effect at the weak level of environmental concern on the relationship between the four personality traits (Agreeableness, Conscientiousness, Extraversion, and Openness to experience) towards the intention to use BRT. The results showed that the mediating effect of environmental concern was not significant for the relationship between Neuroticism and BRT usage intentions. It was reported that one of the reasons people use public transportation is due to an environmental concern during a pandemic.

**Keyword:** big five personalities, environmental concern, public transportation use, bus rapid transit, pandemic

## 1. INTRODUCTION

The COVID-19 pandemic has reduced the usage frequency of all transportation modes (Barbieri et al., 2021), by up to 90% (Przybylowski et al., 2021; Sahraei et al., 2021; Tirachini & Cats, 2020). Based on this condition, it is important to understand the behavior of public transportation during the pandemic. Several studies explain the desire to pay (Awad-Núñez et al., 2021), safety, and comfort (Przybylowski et al., 2021), as well as behavior to maintain health protocols (Dzisi & Dei, 2020; Guellich et al., 2021). Currently, there is a need to explain the behavior of using public transportation during the COVID-19 pandemic (see Irawan et al., 2020), especially on personal factors such as personality. **The meta-analysis study of Zettler et al. (2022) found that differences in personality traits have varying effects on personal perception, behavioral adjustment, and societal evaluation.**

There are still limited studies on travel behavior using public transportation during the COVID-19 pandemic in association with personality factors. The general personality concept studied in the context of behavior using public transportation is the "big five" personality (Costa & McCrae, 2011). Furthermore, Asselmann et al. (2020) found a significant positive relationship between Agreeableness on the reduction in the use of public transportation during the first week of the pandemic in Germany, while other traits were not significantly correlated. Another study conducted by Krupic et al. (2020) proved a positive relationship between Agreeableness and a negative relationship Extraversion with restrictions on the use of public transportation in Croatia, while other traits were not significantly correlated. In contrast to Asselmann et al. (2020) and Krupic et al. (2020) which examines the relationship between personality traits and restrictions on the use of public transportation in pandemic era, I investigate the factors that might **mediate the relation between personality trait and** the use of public transport in a pandemic situation.

Under non-pandemic conditions, many studies explain the role of personality factors in public transportation behavior (Abraham & Wirayudha, 2015; Anagnostopoulou et al., 2020; Gao et al., 2017; Roos et al., 2020; Yazdanpanah & Hosseinlou, 2017). Some previous findings have contradictory results on the relationship between personality traits and intention to use public transportation. For example, Extraversion had a negative relationship (Roos et al., 2020), but Yazdanpanah and Hosseinlou (2017) found a positive relationship of extraversion with intention to use public transportation. Contradictory results also found on the Conscientious trait, Abraham and Wirayudha (2015) and Roos et al. (2020) revealed a negative association of Conscientiousness and intention to use public transportation. Conversely, conscientious individuals more often use public transportation at lower prices (Yazdanpanah & Hosseinlou, 2016). From the literature review, I also note inconsistent findings between the relationship between personality traits and intentions to use public transportation. Openness to Experience (Roos et al., 2020), Agreeableness (Roos et al., 2020; Stachl et al., 2017), and Neuroticism (Yazdanpanah & Hosseinlou, 2017) had a significant correlation with intention to use public transportation. On the other hand, research in Indonesia found that these three traits did not significantly predict the intention to use public transportation (Abraham & Wirayudha, 2015).

Several inconsistent finding of the relationship between personality traits and the intention to

use public transportation has the potential to need new explanations. Shadiqi et al. (2023) found that besides from comfort and accessibility of public transportation, environmental concern predicted the use of public transportation. It is difficult to find previous findings that test the mediating effect of environmental concern on the relationship between personality and public transportation use in pandemic situation. Environmental concern was strongly related to attitudes toward the environment (Ibrahim et al., 2021). Attitudes toward the environment mediated the relationship between personality character and responsible environmental behavior-related waste (Ojedokun, 2011). There was a study by Basic-Sontic et al. (2017) that examines the mediating effect of environmental concern on the relationship between big five personality and pro-environmental behavior during non-pandemic period. I believe that the relationship patterns, as identified by Ojedokun (2011) and Basic-Sontic et al. (2017), can apply to the use of public transportation. This is likely because, firstly, one form of pro-environmental behavior is the use of public transportation (Chan et al., 2023); and secondly, the pandemic Covid-19 conditions can increase environmental concerns (Severo et al., 2021). I argue that environmental concern plays an important role in the relationship between personality traits and intention to use BRT. This study aims to provide answers regarding the mediation effect of environmental concern on the relationship between personality factors and the intention to use BRT during the COVID-19 pandemic.

### **1.1. PERSONALITY TRAITS AND PUBLIC TRANSPORTATION USE**

In this study, I focus on explaining the use of public transportation. The availability of public transportation is one characteristic of sustainable urbanization (Zhang, 2016). Urban communities use public transportation for their daily mobility, and this behavior is part of pro-environmental behavior (Ertz et al., 2016). Public transportation, as a sustainable mode of transportation, becomes a solution to reduce energy consumption and environmental pollution (Lejda et al., 2017). In addition to its environmental benefits, public transportation is also a solution to reduce the use of private transportation, which is prone to traffic accidents, such as motorbike mode in Indonesia (Soehodho, 2017). In this article, I examine the determinant factors that make someone use public transportation, specifically bus rapid transit (BRT). One of the factors is personality.

I choose the big five personality as the main predictor in this study. The factor theory of the Big Five Personality is a structure of differences designed to explain individual development and functioning (McCrae, 2010). The five personality domains are called personality traits, namely (Costa & McCrae, 2011): (1) Extraversion: characterized by openness, easy closeness with others, active, happiness to socialize, optimistic, fun, affectionate, and friendly; (2) Agreeableness: characterized by gentle, kind, helpful, always open and loving to others, very trustworthy, easy to be deceived; (3) Conscientiousness: have a strong stance, well-organized ability, orderly, credible and diligent; (4) Neuroticism: characterized by uncontrolled anxiety, increased anger levels, feelings of unease, often sad and not easy to get along with; (5) Openness to experiences: characterized by high curiosity, creative, confident, imaginative, and always updating new things.

No research has been conducted to examine how personality traits relate to the use of public

transportation during the Covid-19 pandemic. This section provides a review of studies that were carried out before the pandemic. Roos et al. (2020) conducted study in 2017 and found that the personality trait dimensions of Openness to Experience and Agreeableness had a positive relationship with the use of public transportation. Furthermore, conscientiousness and Extraversion had a negative relationship with the use of public transportation in Sweden, while Neuroticism had no significant relationship (Roos et al., 2020). Stachl et al. (2017) found that agreeable people used public transportation applications more often in smartphone in München. Before pandemic Covid-19, for users of public transportation in Jakarta, Conscientiousness is the only personality dimension negatively significant associated with the intention of using public transportation, and the other four traits are not significant (Abraham & Wirayudha, 2015). Another study in Iran before pandemic found a significant negative relationship between Neuroticism and the intention to use public transportation, while Extraversion was positively related to the intention (Yazdanpanah & Hosseinlou, 2017).

Based on the study of the Big Five Personality theory and related scientific findings, the following hypotheses were proposed: Openness to experience, agreeableness, and Extraversion are positively correlated with intention to use BRT; Neuroticism and Conscientiousness are negatively correlated with intention to use BRT in the COVID-19 pandemic.

## 1.2. ENVIRONMENTAL CONCERN

Environmental concern is a person's attitude towards the specific attitude or broader of general environment attitude or environmental value orientations (Cruz & Manata, 2020; Fransson & Gärling, 1999). Personality was found to be an important factor in determining environmental concerns (Chen et al., 2020). In addition, several studies have found a positive relationship between Neuroticism, Conscientiousness (Abdollahi et al., 2017; Hirsh, 2010), Agreeableness (Hirsh, 2010, 2014), Openness to experience (Milfont & Sibley, 2012; Wuertz, 2015), and Extraversion (Abdollahi et al., 2017) on environmental concerns. Also, it was hypothesized that Openness to Experience, Agreeableness, Conscientiousness, Neuroticism, and Extraversion are positively correlated with environmental concern.

Environmental concern is an antecedent of pro-environmental behavior related to the choice of transportation mode (Bouscasse et al., 2018; Daziano & Bolduc, 2013; Heath & Gifford, 2002; Ng & Phung, 2020), and people with low concerns will tend to choose private transportation modes (Bouscasse et al., 2018). Donald et al. (2014) found that environmental concern was not significantly related to the intention to use private and public transportation. In different types of transportation modes, He et al. (2018); Shalender and Sharma (2021) found that there is a relationship between environmental concern and the desire to use electric vehicles as a form of sustainable car transportation.

I argue that environmental concern has an effect as a mediator based on research that relationship between personality traits and pro-environmental behavior. Pro-environmental behavior allows people to achieve explicit goals for environmental benefits by doing something (Steg & de Groot, 2019). There is the positive mediating effect of environmental



concern on certain personality traits (e.g. Openness to experience and Agreeableness) on pro-environmental behavior (Busic-Sontic et al., 2017). Environmental concern was also negatively mediate Extraversion and positively mediate Neuroticism associated with green investment behavior (Busic-Sontic & Brick, 2018). Poier (2021) found the mediating effect of environmental concern on the relationship between Openness to Experience, Agreeableness, and Neuroticism on the adoption of solar energy in households. Busic-Sontic et al. (2017); Busic-Sontic and Brick (2018); Poier (2021) have similarities in describing examples of pro-environmental behavior. One of example pro-environmental behavior on private sphere is the use of public transportation (Ertz et al., 2016). Based on this explanation, it is hypothesized: There is a positive relationship between environmental concern and the intention to use BRT. Furthermore, environmental concern mediates the effects of Agreeableness, Neuroticism, Conscientiousness, Openness to experience, and Extraversion on the intention to use BRT during the COVID-19 pandemic.

### 1.3. CURRENT RESEARCH

This study was conducted in South Kalimantan, because after relying on conventional urban transportation such as "angkot" or public minivan for a long time, the South Kalimantan government finally developed modern public transportation. Currently, one of the most popular types of modern public transportation in the Province of South Kalimantan is the Bus Rapid Transit (BRT) 'Banjarbakula'. BRT is a pioneer of modern public transportation with 11 buses and more than 37 bus stops since 2019 on the Banjarmasin-Banjarbaru city route (Subayu, 2020). The lack of studies on public transportation behavior during the pandemic makes this important. Several studies of public transportation behavior in Indonesia during pre-pandemic period explained user dissatisfaction (Joewono et al., 2016), intentions to use public transportation (Abraham & Wirayudha, 2015), the choice of use of transportation modes (Bastarianto et al., 2019; Van et al., 2014), and the performance of public bus drivers (Suraji et al., 2017). Only Abraham and Wirayudha (2015) explain personal factors in the form of personality on the intention to use public transportation in Jakarta as city with well-developed public transportation systems in Indonesia. Therefore, this current study focuses on the intention to use public transportation during the pandemic especially in places that are developing modern transportation modes, such as in South Kalimantan. Furthermore, it explains the personality factors mediated by environmental concern on the intention to use Banjarbakula BRT. It consists of intention to use public transportation on pandemic; big five traits; and environmental concern as an outcome, predictor, and mediator variables respectively (see Figure 1).

[Figure 1 about here]

## 2. METHODS

### 2.1. PARTICIPANTS

An online correlational survey was conducted on 19-26 March 2021, and data were collected using surveymonkey.com on 425 participants (Mean age=19,770, SD=1,635, range=17-31). The majority were women (75.8%), currently attending school/college (90.6%), living in urban



areas (81.9%), and never using Banjarbakula BRT before (64.5%). A total of 89.7% live in two cities that are passed by the Banjarbakula BRT service line, namely Banjarmasin and Banjarbaru. Meanwhile, 10.4% live in Martapura City closest to BRT services, and these three cities are located in South Kalimantan Province, Indonesia.

## **2.2. MEASURES**

### **2.2.1. INTENTION TO USE BRT**

Participants' intention to use the Banjarbakula Bus Rapid Transit (BRT) during a pandemic was measured using two items with a correlation value of  $r=.641$ ,  $p<.001$ . An example of an item statement is "During the covid-19 pandemic, I intend to use the Banjarbakula BRT transportation again to go to work or study places/services and shopping centers/recreational places". The answer choices for this measuring instrument ranges 1=Strongly disagree to 4=Strongly agree.

### **2.2.2. ENVIRONMENTAL CONCERN**

This study adapted the New Ecological Paradigm scale (NEP-15, Dunlap et al., 2000), and the translation was conducted by adopting the instrument from Beaton et al. (2000) to Indonesian. Furthermore, two items that have correlation values with a low total score were eliminated. This affected the quality of reliability, and in total there were 13 statement items with good reliability,  $\alpha = .742$ . An example item is "when the things that are happening now continue, a major ecological disaster will be faced". The responses measurement ranges from 1=Strongly disagree to 4=strongly agree.

### **2.2.3. BIG FIVE PERSONALITY**

**Big Five Personality.** This measuring instrument consists of personality traits Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness to experience. The study uses Indonesian version of the Big Five Inventory (BFI) of 28 items from Ramdhani (2012) adapted from John andd Srivastava (1999). Among the five personality traits, a statement item was eliminated because the quality was less equal. Agreeableness consists of six valid items out of a total of seven items with reliability  $\alpha = .664$ , for example, the item "I am a forgiving person". Conscientiousness consists of six items with reliability  $\alpha = .727$ , for example, the item "I am a reliable worker". Extraversion consists of five items with reliability  $\alpha = .749$ , for example, the item "I am an enthusiastic person". Neuroticism consists of four items with reliability  $\alpha = .781$ , for example, the item "I am a moody person". Openness to experience consists of six items with reliability  $\alpha = .712$ , for example, the item "I am a person who often gets new ideas". The range reliability value of the five personality traits from  $\alpha = .664$  to  $.781$ . The BFI use 1=Strongly disagree to 4=strongly agree as the response scale.

### **2.2.4. CONTROL VARIABLE**

Five control variables were determined including concerns about public transportation, age, gender, place of residence, and ever/never using BRT before. Before mediation model analysis, the variables that need to be controlled based on the results of the bivariate correlation test should be checked.

**Concern about using public transportation.** This study asked a statement item about "The Covid-19 pandemic makes me anxious to take public transportation". Responses 1=strongly disagree to 4=strongly agree.

**Demographic factors.** This study asked several demographic factors, namely age, gender (1=male, 2=female), place of residence (1=Urban, 0=Rural), whether they had taken BRT before (PT User: 1=user, 0=not users).

### 2.3. STATISTICAL ANALYSIS

Before conducting statistical analysis, it is necessary to check the quality of the data first. There is a missing value < 1% of all items in all measuring instruments, and intervention was rendered using expectation maximization (EM). Furthermore, data analysis started with the bivariate correlation of all variables. To answer the hypothesis, the mediation regression model was performed using PROCESS macro in SPSS with 1,000 bootstrapping (Model 4, Hayes, 2018). Analysis of the mediation regression model has conducted 5 models according to 5 personality traits. It also controls the covariate variables that are shown to affect the regression results. The covariate variables were determined from the results of the significant bivariate correlation test.

## 3. RESULT

In the bivariate correlation test, concerned with using PT in the pandemic were negatively correlated to the intention to use BRT ( $r=-.210$ ,  $p<.01$ ). This formed the control for the variable in the regression analysis of the mediation model. **I found other control variables such as age, gender, place of residence, and ever/never using BRT before, are not related to the intention to use BRT. Therefore, these variables are not included in the regression model as covariate variables.** Among the independent variables measured (see table 1), two were weakly correlated to the intention to use BRT in a pandemic, namely environmental concern ( $r=.140$ ,  $p<.01$ ) and Extraversion ( $r=.114$ ,  $p<.05$ ).

*[Table 1 about here]*

In the regression analysis of the mediation model, five models were tested according to the number of independent variables of five personality traits. The mediator variable in this analysis is an environmental concern. Meanwhile, the dependent variable is the intention to use PT in a pandemic. **I set the score of concerned with using PT in the pandemic as covariate variable in regression model.** The results of the complete analysis can be seen in table 2.

The five models showed that Agreeableness ( $\beta=.286$ ,  $SE=.037$ ,  $t(424)=6.212$ ,  $p<.001$ ), Conscientiousness ( $\beta=.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ), Extraversion ( $\beta=.198$ ,  $SE=.029$ ,  $t(424)=4.226$ ,  $p<.001$ ), and Openness to experience ( $\beta=.254$ ,  $SE=.036$ ,  $t(424)=5.504$ ,  $p<.001$ ) significantly predicts environmental concern but not Neuroticism ( $\beta=.018$ ,  $SE=.027$ ,  $t(424)=.377$ ,  $p=n.s.$ ). The five models also found that environmental concern significantly predicted positive intentions to use BRT (see table 2 for detailed results).

In the results of the mediation model 1 test, environmental concern significantly mediates the relationship between Agreeableness and the intention to use BRT ( $\beta=.056$ ,  $p<.05$ ,  $BootSE=.018$ ,  $BootCI$  95% [.021, .093]). Similarly, model 2 showed that environmental concern significantly mediates the relationship between Conscientiousness and the intention to use BRT ( $\beta=.041$ ,  $p<.05$ ,  $BootSE=.016$ ,  $BootCI$  95% [.012, .075]). The previous model also found a significant mediating effect of environmental concern on the relationship between Extraversion and BRT use intentions in Model 3 ( $\beta=.033$ ,  $p<.05$ ,  $BootSE=.014$ ,  $BootCI$  95% [.010, .067]). It mediates the significant relationship between Openness to experience and the intention to use BRT in model 5 ( $\beta=.043$ ,  $p<.05$ ,  $BootSE=.017$ ,  $BootCI$  95% [.012, .079]). All mediation effects in models 1, 2, 3, and 5 are full positive mediation because the results of the analysis showed that the direct effect (coefficient value c) from the independent to the dependent variable is not significant (see table 2). Meanwhile, there is no significant mediating effect of environmental concern on the relationship between Neuroticism and the intention to use BRT ( $\beta=.033$ ,  $p=n.s.$ ,  $BootSE=.010$ ,  $BootCI$  95% [-.016, .024]).

A significant negative effect was also found from the control variable of the concern of using BRT during a pandemic in model 1 ( $\beta=-.243$ ,  $SE=.051$ ,  $t(424)=-5.092$ ,  $p<.001$ ), model 2 ( $\beta=-.248$ ,  $SE=.051$ ,  $t(424)=-5.212$ ,  $p<.001$ ), model 3 ( $\beta=-.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ), model 4 ( $\beta=-.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ), and model 5 ( $\beta=-.239$ ,  $SE=.036$ ,  $t(424)=5.119$ ,  $p<.001$ ). Therefore, the concern effect of using BRT can reduce the intention to use BRT in a Pandemic. The right decision was made to control this using a covariate variable in the mediation regression model analysis.

*[Table 2 about here]*

#### 4. DISCUSSION

The five personality traits were not significantly related to the intention to use BRT during the pandemic. On the total effect, there was a significant partial relationship of Conscientiousness, Extraversion, and Openness to experience on the intention to use BRT without involving mediator variables in the regression estimation. Agreeableness, Conscientiousness, Extraversion, and Openness to experience are partially related to environmental concerns. However, Neuroticism is not significantly related, and across all models, environmental concern was significantly related to the intention to use BRT during the COVID-19 pandemic. An important finding was the proven effect of environmental concern mediation. The main hypothesis, environmental concern significantly mediates the relationship between personality traits of Openness to Experience, Agreeableness, conscientiousness, and Extraversion (except Neuroticism) with intention to use BRT, and the four indirect effects are at a weak regression coefficient level. This result is supported by the average score of the BRT usage intention variable which is at a low level (mean score=2.331 from 1-4 of scale) (see table 1).

The results of this study found that all direct effects of the five personality traits were not significantly related to the intention to use BRT (Bus Rapid Transit). However, some total effects of personality traits were found to be significant in relation to the intention to use BRT. During the pandemic, agreeableness was not significantly related to the intention to use BRT

(indirect and total effect) which is in line with the study conducted by Abraham and Wirayudha (2015). Conscientiousness did not directly affect the intention to use BRT, but the coefficient of total effect (without involving the mediator variable) was significant. Previous studies found a negative relationship between conscientiousness and the intention to use public transportation (Abraham & Wirayudha, 2015; Roos et al., 2020). Openness to experience does not have a direct relationship with the intention to use BRT. However, there is a significant total effect between this trait and intention when it does not involve the mediator variable. My study did not obtain a direct effect of extraversion on the intention to use BRT, but the coefficient of total effect (without involving a mediator) found a significant relationship. There was an insignificant relationship from Neuroticism to the intention to use BRT during the pandemic (indirect effect and total effect) in line with the findings of Roos et al. (2020). However, this contrasts with Matz and Harari (2020) study, where a positive relationship with the desire to spend time in transit was obtained (vehicle). During the pandemic, people restricted their movements and practiced social distancing, such as avoiding public transportation, due to the potential for social interactions that could lead to the transmission of Covid-19. This means that there is another explanation that can account for why people with certain personality types are willing to use public transportation, and I believe environmental concern is the key variable.

The pandemic has both positive and negative impacts on the environment. One of the positive impacts is the restriction of transportation activities to reduce noise and air pollution (Rume & Islam, 2020). The pandemic affects the environment (Zambrano-Monserrate et al., 2020), and the lockdown that reduced mobility increase air quality rates in several countries (Muhammad et al., 2020; Sahraei et al., 2021). Furthermore, the pandemic situation increased environmental awareness (Ali et al., 2021; Severo et al., 2021). The survey results of Kachaner et al. (2020) of 3,000 people from several countries found that 70% of participants became more concerned with the environment than before the pandemic. The pandemic condition makes the effect of environmental concern to be significant on the intention to use public transportation. In addition, 76% of participants thought that environmental issues were as worrying (or more worrying) as health problems during the COVID-19 pandemic (Kachaner et al., 2020). The findings explain that anxiety has a strong effect on reducing the intention to use BRT during a pandemic (significant effect from the control variable). The state anxiety during the pandemic reduced the sense of security in public transportation (Dong et al., 2021), there was a tendency for public transportation users to develop generalized anxiety disorder as a response to the pandemic situation (Kassaw & Pandey, 2022).

The analysis results prove that the mediating effect of environmental concern is not only evident in the relationship between neuroticism and the intention to use BRT, while other personality traits have a significant mediating effect. This study was reported that people with high scores on Agreeableness choose to use BRT when there is an environmental concern effect as a mediator. The use of public transportation can be classified as pro-environmental behavior. The findings of the mediating effect are in line with the study of Basic-Sontic et al. (2017) and Poier (2021). One of the characteristics of agreeableness was altruistic and warm or called empathetic concern (Hirsh, 2010; Swami et al., 2010). Furthermore, altruism seems to be

directed at others (Graziano & Habashi, 2010; Oda et al., 2014) and the environment (Schultz, 2001). It is believed that when a pandemic occurs, Agreeable people need concern and altruism on environmental issues to decide on the use of public transportation. This is because one of the goals of using public transportation is to reduce the impact of air pollution or maintain environmental quality.

Furthermore, the results showed that environmental concern positively mediated the relationship between Conscientiousness and intention to use BRT. One of the most common domains was orderliness which includes the tendency of people to emphasize tidiness, cleanliness, and planning (Roberts et al., 2014). Furthermore, conscientious people have a “future time perspective” planning (Przepiorka et al., 2020) and responsibilities (Roberts et al., 2014). This study assesses the mediating effect of environmental concern because people with high Conscientiousness perceive environmental conditions as a realistic plan and they feel the need to be responsible by using public transportation. Moreover, people feel more concerned and responsible for environmental sustainability during pandemic situations (see Ali et al., 2021; Severo et al., 2021).

The results showed that environmental concern positively mediates the relationship between extraversion and intention, but at a weak effect level, and one of the facets was sociability (John, 2021). People with high Extraversion scores tend to rate the impact of air pollution on human health (Hirsh, 2014). It is suspected that environmental concerns arise due to awareness of the negative impacts related to air pollution. Furthermore, it makes people with high Extroversion choose to use public transportation, and this decision will certainly provide social benefits to others’ health.

People with the Openness to experience personality type want to use BRT in a pandemic when environmental concerns have a significant effect as a mediator. In the context of pro-environmental behavior, the findings of the mediating effect were in line with Busic-Sontic et al. (2017) and Poier (2021). The characteristics of Openness to experience were high curiosity (Costa & McCrae, 2011) and aesthetics related to nature (Silvia et al., 2015). These two traits made people with high openness to improve their experience and evaluate their environment. Meanwhile, they become interested in using public transportation as a form of action to reduce the negative impact on nature after gaining knowledge on environmental conditions.

This personality trait did not significantly predict intention through the mediating effect of environmental concern. During a pandemic, the need for safety and comfort becomes an important factor that determines the use of public transportation (Awad-Núñez et al., 2021; Przybyłowski et al., 2021). Furthermore, the COVID-19 pandemic has made people with high neuroticism scores prefer to practice social distancing (Ludeke et al., 2021). However, it is difficult to keep social distance on public transport full of passengers. Closer contact increases the risk of exposure to the virus (Yezli & Khan, 2020), and this concern reduces the desire to use public transportation (Chang et al., 2021). For people with the Neuroticism personality type, using public transportation is a scary thing.

The environmental concern factor has a weak effect both as a predictor and a mediator. This study is limited by only explaining environmental concerns and personality traits. This is because other possible factors affect the desire to use public transportation during the COVID-19 pandemic. Furthermore, it was limited to only a relatively new location using modern public transportation, the Bus Rapid Transit Banjarbakula as my context study which started operating in 2019. Locations with established and well-developed of public transportation system should be considered. The future researcher should examine the other public transportation modes include commuter trains, light rail transit, mass rapid transit, airplane, and ferry. My research is limited to using a correlational survey approach, so it cannot generate causal explanations and has weaknesses in internal validity without manipulated variable (Gravetter & Forzano, 2018). Therefore, I suggest that future researchers use experimental methods.

## 5. CONCLUSIONS

Personality traits did not directly predict the intention to use BRT during the COVID-19. Environmental concern was found to be positively related to intention. There was a full positive mediating effect on the relationship between 4 personality traits (Agreeableness, Conscientiousness, Extraversion, and Openness to experience) on intentions to use BRT. Meanwhile, environmental concern was not found to significantly mediate the effects of Neuroticism and the intention to use BRT. During a pandemic, environmental concerns is important, because the use of public transportation will have a positive impact on improving quality of environmental. The findings provide advice on local policies related to public transportation (Irawan et al., 2020). This includes promoting the use of public transportation by observing the information about positive impacts on the environment. In particular, people with neurotic personality traits may not have a concern for the environment which can increase their intention to use public transportation, alternatively, safety systems need to be improved.

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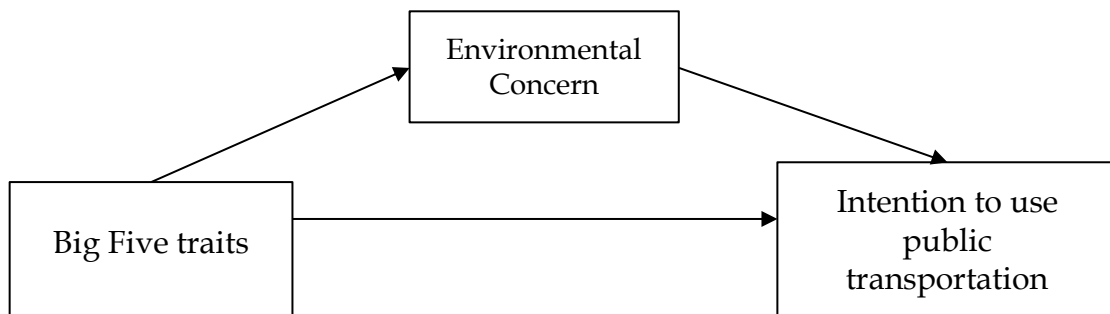
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**Figure 1.**

The analytical model framework to examine the mediating effect of environmental concern on the relationship between big five personalities and intention to use BRT



**Table 1.**

*Bivariate correlation variables*

| Variables                               | Mean  | SD    | 1 | 2       | 3    | 4      | 5      | 6      | 7      | 8      | 9      | 10      | 11     | 12      |
|-----------------------------------------|-------|-------|---|---------|------|--------|--------|--------|--------|--------|--------|---------|--------|---------|
| 1. Age                                  | 19.77 | 1.635 | - | -.150** | .091 | .366** | -.064  | .072   | -.021  | .093   | .044   | -.229** | .053   | .080    |
| 2. Gender                               | -     | -     |   | -       | .048 | .053   | .129** | -.030  | .036   | -.011  | .005   | .109*   | .016   | -.012   |
| 3. Residence                            | .819  | .386  |   |         | -    | .145** | .021   | .021   | .047   | .135** | .106*  | -.086   | .074   | -.032   |
| 4. BRT User                             | -     | -     |   |         |      | -      | -.078  | .050   | -.035  | .076   | .029   | -.079   | .057   | .095    |
| 5. Concern to use PT<br>in Pandemic     | 3.379 | .641  |   |         |      |        | -      | .188** | .107*  | .108*  | .052   | .134**  | .043   | -.210** |
| 6. Environmental<br>Concern             | 3.190 | .309  |   |         |      |        |        | -      | .303** | .256** | .207** | .043    | .262** | .140**  |
| 7. Agreeableness                        | 3.160 | .381  |   |         |      |        |        |        | -      | .449** | .433** | -.107*  | .335** | .002    |
| 8. Conscientiousness                    | 2.910 | .405  |   |         |      |        |        |        |        | -      | .502** | -.238** | .485** | .08     |
| 9. Extraversion                         | 2.850 | .503  |   |         |      |        |        |        |        |        | -      | -.308** | .439** | .114*   |
| 10. Neuroticism                         | 2.890 | .543  |   |         |      |        |        |        |        |        |        | -       | -.018  | -.065   |
| 11. Openness to<br>experience           | 2.930 | .392  |   |         |      |        |        |        |        |        |        |         | -      | .095    |
| 12. Intention to use<br>BRT in pandemic | 2.331 | .680  |   |         |      |        |        |        |        |        |        |         |        | -       |

*Note.* Gender: 1=male, 2=female; Residence: 1=Urban, 0=Rural; PT User: 1=user, 0=not user; \*\* p < .01; \* p < .05.

**Table 2.**

Mediation analysis result of intention to use Public Transportation (Y)

|                                                                  | Path coefficients ( $\beta$ ) |                 |                        |                          | Indirect effect          |                                                       |
|------------------------------------------------------------------|-------------------------------|-----------------|------------------------|--------------------------|--------------------------|-------------------------------------------------------|
|                                                                  | Path a<br>(X→M)               | Path b<br>(M→Y) | Path c<br>(Total eff.) | Path c'<br>(Direct eff.) | Estimates<br>( $\beta$ ) | Confidence Interval 95%<br>of $\beta$ (Bootstrapping) |
| <b>Model 1 (R<sup>2</sup>=.078, F(3, 421)=11.901, p&lt;.001)</b> |                               |                 |                        |                          |                          |                                                       |
| Agreeableness (X)                                                | .286(.037)***                 |                 | .025(.085)             | -.031(.088)              |                          |                                                       |
| Environmental concern (M)                                        |                               | .195(.011)***   |                        |                          |                          |                                                       |
| A → EC → IUPT                                                    |                               |                 |                        |                          | .056(.018)*              | .021, .093                                            |
| <b>Model 2 (R<sup>2</sup>=.081, F(3, 421)=12.366, p&lt;.001)</b> |                               |                 |                        |                          |                          |                                                       |
| Conscientiousness (X)                                            | .239(.036)***                 |                 | .104(.080)*            | .063(.081)               |                          |                                                       |
| Environmental concern (M)                                        |                               | .171(.108)**    |                        |                          |                          |                                                       |
| C → EC → IUPT                                                    |                               |                 |                        |                          | .041(.016)*              | .012, .075                                            |
| <b>Model 3 (R<sup>2</sup>=.085, F(3, 421)=13.099, p&lt;.001)</b> |                               |                 |                        |                          |                          |                                                       |
| Extraversion (X)                                                 | .198(.029)***                 |                 | .125(.064)**           | .092(.065)               |                          |                                                       |
| Environmental concern (M)                                        |                               | .167(.107)**    |                        |                          |                          |                                                       |
| E → EC → IUPT                                                    |                               |                 |                        |                          | .033(.014)*              | .010, 0.67                                            |
| <b>Model 4 (R<sup>2</sup>=.079, F(3, 421)=12.039, p&lt;.001)</b> |                               |                 |                        |                          |                          |                                                       |
| Neuroticism (X)                                                  | .018(.027)                    |                 | -.048(.060)            | -.041(.059)              |                          |                                                       |
| Environmental concern (M)                                        |                               | .187(.105)***   |                        |                          |                          |                                                       |
| N → EC → IUPT                                                    |                               |                 |                        |                          | .003(.010)               | -.016, .024                                           |
| <b>Model 5 (R<sup>2</sup>=.081, F(3, 421)=12.322, p&lt;.001)</b> |                               |                 |                        |                          |                          |                                                       |
| Openness to experience (X)                                       | .254(.036)***                 |                 | .104(.082)*            | .060(.084)               |                          |                                                       |
| Environmental concern (M)                                        |                               | .170(.108)**    |                        |                          |                          |                                                       |
| O → EC → IUPT                                                    |                               |                 |                        |                          | .043(.017)*              | .012, 0.79                                            |

Notes: A=Agreeableness, C= Conscientiousness, E= Extraversion, N= Neuroticism, O= Openness to experience, EC= Environmental Concern, IUPT= Intention to Use Public transportation, coeffects regression= standardized coefficient, \*p< .05, \*\*p< .01, \*\*\* p<.001.

Appendix.

Figure A1. The model 1 mediation analysis of Agreeableness, environmental concern, and intention to use BRT (\*  $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ )

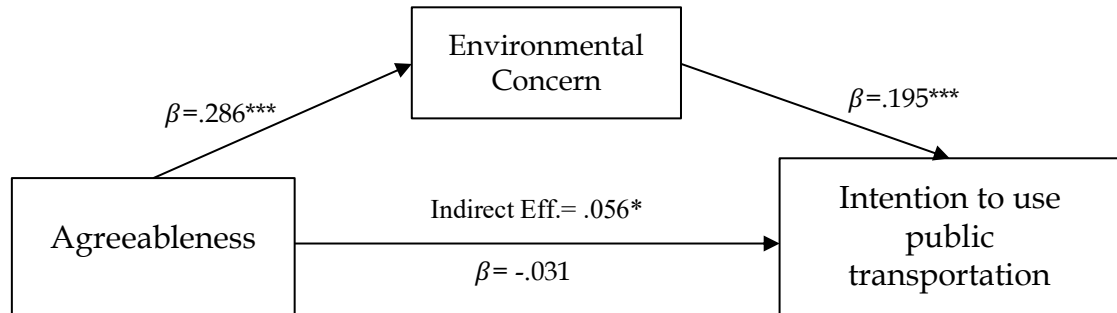


Figure A2. The model 2 mediation analysis of Conscientiousness, environmental concern, and intention to use BRT (\*  $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ )

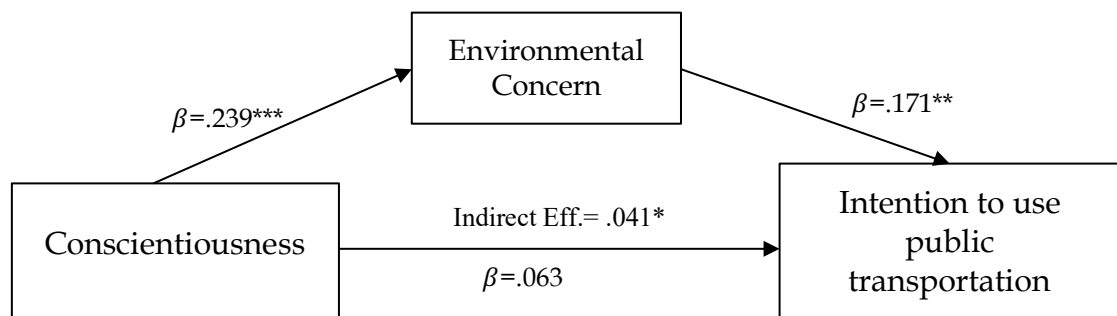


Figure A3. The model 3 mediation analysis of Extraversion, environmental concern, and intention to use BRT (\*  $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ )

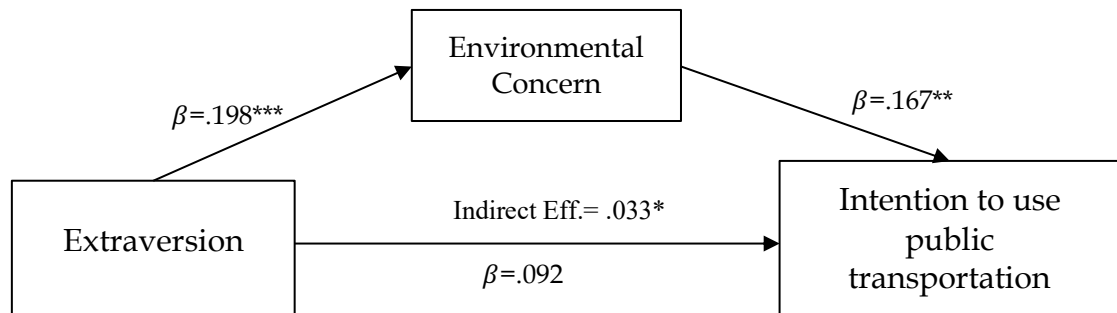


Figure A4. The model 4 mediation analysis of Neuroticism, environmental concern, and intention to use BRT (\*  $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ )

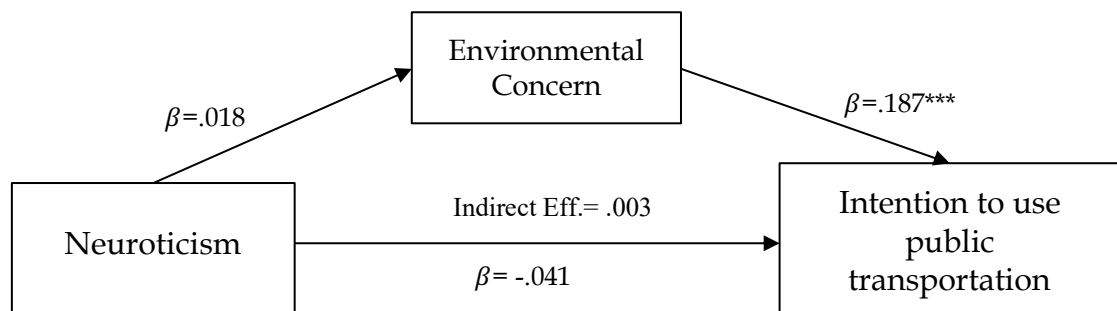
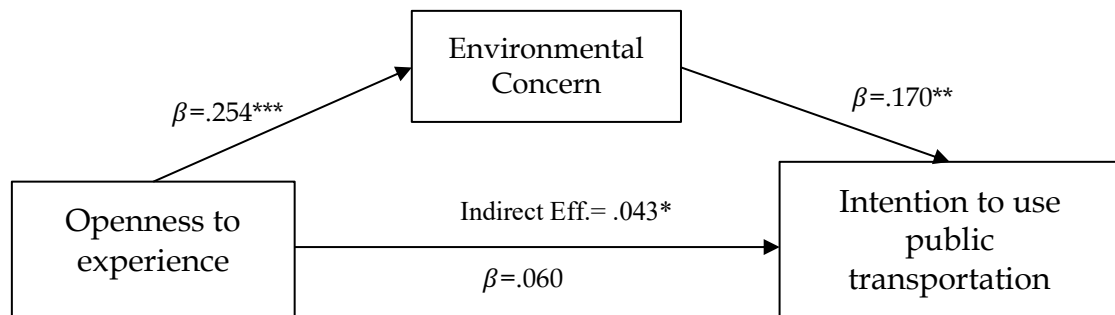


Figure A5. The model 5 mediation analysis of Openness to experience, environmental concern, and intention to use BRT (\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ )





Muhammad Abdan Shadiqi <abdan.shadiqi@ulm.ac.id>

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## MS #1136 - Psychological Research on Urban Society Decision Letter

1 message

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Debora Eflina Purba <editor-proust-1136-3719224@dcuischolarhub.bepress.com>

Sat, Sep 2, 2023 at 11:30  
AM

To: =?UTF-8?Q?=22Muhammad\_Abdan\_Shadiqi=22?= <abdan.shadiqi@ulm.ac.id>

Cc: The Authors <authors-proust-1136@dcuischolarhub.bepress.com>, The Editors <editors-proust-1136@dcuischolarhub.bepress.com>

Dear Dr. Muhammad Abdan Shadiqi,

I am delighted to inform you that your submission titled "Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator" has been accepted into Psychological Research on Urban Society after undergoing a thorough review process. Congratulations!

We are sending your manuscript for a copyedit process to ensure its accuracy and adherence to our formatting guidelines. We will be contacting you soon after the copyedit process for the final revision of your manuscript.

We sincerely appreciate your contribution to our journal, and thank you for choosing Psychological Research on Urban Society as the platform for your research.

Thank you,

Debora Eflina Purba  
Editor

Psychological Research on Urban Society

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Muhammad Abdan Shadiqi <[abdan.shadiqi@ulm.ac.id](mailto:abdan.shadiqi@ulm.ac.id)>

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## MS #1136: Update submitted for "Personality and Intention to use Bus Rapid Transit (BRT) on Pandemic COVID-19: The role of environmental concern as a mediator"

1 message

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Editors of Psychological Research on Urban Society <[editors-proust-1136@dcuischolarhub.bepress.com](mailto:editors-proust-1136@dcuischolarhub.bepress.com)>

Mon, Sep 25, 2023 at  
1:07 PM

To: =?UTF-8?Q?=22Muhammad\_Abdan\_Shadiqi=22?= <[abdan.shadiqi@ulm.ac.id](mailto:abdan.shadiqi@ulm.ac.id)>

Cc: The Authors <[authors-proust-1136@dcuischolarhub.bepress.com](mailto:authors-proust-1136@dcuischolarhub.bepress.com)>, Assigned Editor <[editor-proust-1136@dcuischolarhub.bepress.com](mailto:editor-proust-1136@dcuischolarhub.bepress.com)>

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The reason for update is:  
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The changes made are:

The authors are:  
"Muhammad Abdan Shadiqi" <[abdan.shadiqi@ulm.ac.id](mailto:abdan.shadiqi@ulm.ac.id)>

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Thank you,

The Editors

Psychological Research on Urban Society

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# Personality and the Intention to use Bus Rapid Transit on Pandemic COVID-19: The role of environmental concern as a mediator

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## Abstract

The COVID-19 pandemic has had an impact on the behavior of public transport users and raised concerns about the means of transportation. Therefore, this study aims to explain the mediating effect of environmental concern in the relationship between five personality traits on the intention to use Bus Rapid Transit (BRT) during the pandemic. A correlational survey of 425 participants was conducted, and the analysis found that all five personality traits did not directly predict the intention to use BRT. Furthermore, there was a positive mediating effect at the weak level of environmental concern on the relationship between four of the personality traits (agreeableness, conscientiousness, extraversion, and openness to experience) toward the intention to use BRT. The results showed that the mediating effect of environmental concern was not significant for the relationship between neuroticism and BRT usage intentions. It was reported that one of the reasons people use public transportation is due to environmental concerns during a pandemic.

## Keywords

Big Five Personality Traits, Environmental Concern, Public Transportation Use, Bus Rapid Transit, Pandemic

The COVID-19 pandemic has reduced the usage frequency of all transportation modes ten countries on six continents (Barbieri et al., 2021), by up to 90% (Przybylowski et al., 2021; Sahraei et al., 2021; Tirachini & Cats, 2020). Based on this condition, it is important to understand the behavior to use public transportation during the pandemic. Several studies explain the desire to pay (Awad-Núñez et al., 2021), safety, and comfort (Przybylowski et al., 2021), as well as behavior looking to maintain health protocols (Dzisi & Dei, 2020; Guellich et al., 2021). Currently, there

is a need to explain the practice of using public transportation during the COVID-19 pandemic (see Irawan et al., 2020), especially in terms of personal factors such as personality. The meta-analysis study of Zettler et al. (2022) found that differences in personality traits have varying effects on personal perception, behavioral adjustment, and societal evaluation.

There are still limited studies on travel behavior using public transportation during the COVID-19 pandemic in terms of personality factors. The general personality concept studied in the context of behavior using public transportation is the "Big Five Personality Traits" (Costa & McCrae, 2011). Furthermore, Asselmann et al. (2020) found a significant positive relationship between agreeableness and the reduction in the use of public transportation during the first week of the pandemic in Germany, while other traits were not significantly correlated. Another study conducted by Krupic et al. (2010) demon-

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strated positive and negative relationships between agreeableness and extraversion, respectively, and restrictions on the use of public transportation in Croatia, while other traits were not significantly correlated. In contrast to Asselmann et al. (2020) and Krupic et al. (2010) which examined the relationship between personality traits and restrictions on the use of public transportation in the pandemic era, I investigate the factors that might mediate the relationship between a given personality trait and the use of public transport in a pandemic.

Under nonpandemic conditions, many studies explain the role of personality factors in public transportation behavior (Abraham & Wirayudha, 2015; Anagnostopoulou et al., 2020; Gao et al., 2017; Roos et al., 2020; Yazdanpanah & Hosseinlou, 2017). Some previous findings have produced contradictory results on the relationship between personality traits and intention to use public transportation. For example, extraversion had a negative relationship (Roos et al., 2020), but, in contrast, Yazdanpanah and Hosseinlou (2017) found a positive relationship between extraversion and the intention to use public transportation. Contradictory results are also found on the conscientious trait; Abraham and Wirayudha (2015) and Roos et al. (2020) revealed a negative association between conscientiousness and the intention to use public transportation. Conversely, conscientious individuals more often use public transportation based on the cost of transportation expenses (Yazdanpanah & Hosseinlou, 2016). From the literature review, I also note inconsistent findings in the relationship between personality traits and the intention to use public transportation. Openness to experience (Roos et al., 2020), agreeableness (Roos et al., 2020; Stachl et al., 2017), and neuroticism (Yazdanpanah & Hosseinlou, 2017) had a significant correlation with the intention to use public transportation. Conversely, research in Indonesia found that these three traits did not predict the intention to use public transportation significantly (Abraham & Wirayudha, 2015).

Several inconsistent findings of the relationship between personality traits and the intention to use public transportation have the potential to need new explanations. Shadiqi et al. (2023) found that besides the comfort and accessibility

of public transportation, environmental concern predicted the use of public transportation. It is difficult to find previous findings that test the mediating effect of environmental concerns on the relationship between personality and public transportation use during a pandemic. Environmental concern was strongly related to attitudes toward the environment (Ibrahim et al., 2021). Attitudes toward the environment mediated the relationship between personality characteristics and responsible environmental behavior-related waste (Ojedokun, 2011). A study by Basic-Sontic et al. (2017) examined the mediating effect of environmental concern on the relationship between the Big Five Personality Traits and pro-environmental behavior during a non-pandemic period. I believe that the relationship patterns, as identified by Basic-Sontic et al. (2017), can apply to the use of public transportation. This is likely because, first, one form of pro-environmental behavior is the use of public transportation (Chan et al., 2023); and second, pandemic conditions can increase environmental concerns (Severo et al., 2021). I argue that environmental concern plays an important role in the relationship between personality traits and the intention to use public transportation. This study aims to provide answers regarding the mediation effect of environmental concerns on the relationship between personality factors and the intention to use public transportation during the COVID-19 pandemic. In this research, I employed Bus Rapid Transit (BRT) as a form of public transportation. BRT is an integrated bus transportation system that offers speed, comfort, and cost-effective in urban area (Wright, 2003).

### ***Personality Traits and Public Transportation Use***

In this study, I focus on explaining the use of public transportation. The availability of public transportation is one characteristic of sustainable urbanization (Zhang, 2016). Urban communities use public transportation for their daily mobility. The use public transportation behavior is kind of proenvironmental behavior (Ertz et al., 2016). Public transportation, as a sustainable mode of transportation, becomes a way to reduce energy consumption and environmental pollution (Lejda et al., 2017). In addition to its environmental benefits, public transportation is also a way to reduce the use of private transpor-

tation, which is prone to traffic accidents, such as the motorbike mode in Indonesia (Soehodho, 2017). In this study, I examine the determinant factors that make someone use public transportation, specifically BRT, and one of the factors is personality.

I chose the Big Five Personality Traits as the main predictor in this study. The factor theory of the Big Five Personality Traits is a structure of differences designed to explain individual development and functioning (McCrae, 2010). The five personality domains are called personality traits, namely (Costa & McCrae, 2011): (1) Extraversion: characterized by openness, easy closeness with others, being active, happiness to socialize, being optimistic, fun, affectionate, and friendly; (2) Agreeableness: characterized by being gentle, kind, helpful, always open and loving to others, very trustworthy, and easily deceived; (3) Conscientiousness: has a strong stance, well-organized ability, is orderly, credible and diligent; (4) Neuroticism: characterized by uncontrolled anxiety, increased anger levels, feelings of unease, often sad and not easy to get along with; (5) Openness to experiences: characterized by high curiosity, creativity, confidence, being imaginative, and always looking for novelty.

No research has been conducted to examine how personality traits relate to the use of public transportation during the COVID-19 pandemic, but this section does provide a review of studies that were carried out before the pandemic. Roos et al. (2020) conducted a study in 2017 and found that the personality trait dimensions of openness to experience and agreeableness had a positive relationship with the use of public transportation. Furthermore, conscientiousness and extraversion had a negative relationship with the use of public transportation in Sweden, while neuroticism had no significant relationship (Roos et al., 2020). Stachl et al. (2017) found that agreeable people used public transportation applications more often in smartphones in Munich. Before the COVID-19 pandemic, for users of public transportation in Jakarta, conscientiousness is the only personality dimension negatively significantly associated with the intention of using public transportation, and the other four traits are not significant (Abraham & Wirayudha, 2015). Another study in Iran before

the pandemic found a significant negative relationship between neuroticism and the intention to use public transportation, while extraversion was positively related to the intention (Yazdanpanah & Hosseinlou, 2017).

Based on the study of the Big Five Personality Traits theory and related scientific findings, the following hypotheses are proposed: Openness to experience, agreeableness, and extraversion are positively correlated with the intention to use BRT; neuroticism and conscientiousness are negatively correlated with the intention to use BRT in the COVID-19 pandemic.

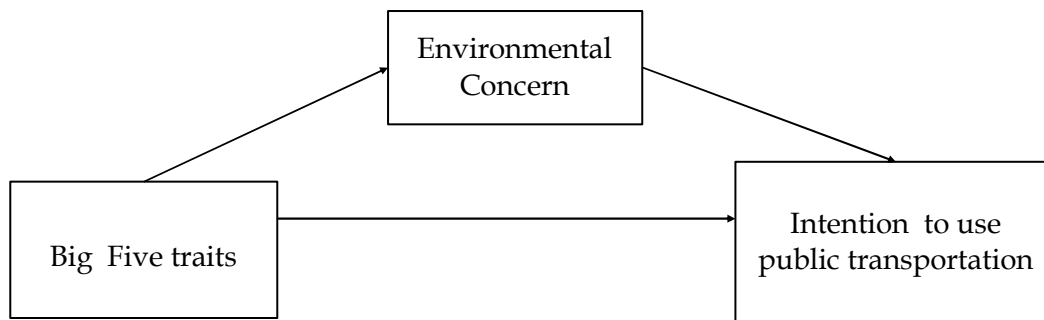
### *Environmental Concern*

Environmental concern is a person's attitude toward specific environment behavior or environmental value orientations (Cruz & Manata, 2020; Fransson & Gärling, 1999). Personality was found to be an important factor in determining environmental concern (Chen et al., 2020). In addition, several studies have found a positive relationship between neuroticism, conscientiousness (Abdollahi et al., 2017; Hirsh, 2010), agreeableness (Hirsh, 2010, 2014), openness to experience (Milfont & Sibley, 2012; Wuertz, 2015), and extraversion (Abdollahi et al., 2017) on environmental concern. Furthermore, it was hypothesized that openness to experience, agreeableness, conscientiousness, neuroticism, and extraversion are positively correlated with environmental concern.

Environmental concern is an antecedent of pro-environmental behavior related to the choice of transportation mode (Bouscasse et al., 2018; Daziano & Bolduc, 2013; Heath & Gifford, 2002; Ng & Phung, 2020), and people with a low level of concerns will tend to choose private transportation modes (Bouscasse et al., 2018). Donald et al. (2014) found that environmental concern was not significantly related to the intention to use private and public transportation. In different types of transportation modes, He et al. (2018) and Shalender and Sharma (2021) found that there is a relationship between environmental concern and the desire to use electric vehicles as a form of sustainable car transportation.

I argue that environmental concern has an effect as a mediator based on research on the relationship between personality traits and pro-

**Figure 1.** The analytical model framework to examine the mediating effect of environmental concern on the relationship between the Big Five Personality Traits and intentions to use the BRT



environmental behavior. Proenvironmental behavior allows people to achieve explicit goals for environmental benefits by doing something (Steg & de Groot, 2019). There is a positive mediating effect of environmental concern on certain personality traits (e.g., openness to experience and agreeableness) on pro-environmental behavior (Busic-Sontic et al., 2017). Environmental concern also negatively mediated extraversion and positively mediated neuroticism associated with green investment behavior (Busic-Sontic & Brick, 2018). Poier (2021) found the mediating effect of environmental concern on the relationship between openness to experience, agreeableness, and neuroticism on the adoption of solar energy in households. Busic-Sontic et al. (2017), Busic-Sontic and Brick (2018), and Poier (2021) have similarities in describing examples of pro-environmental behavior. One example of pro-environmental behavior on the private sphere is the use of public transportation (Ertz et al., 2016). Based on this explanation, it is hypothesized that there is a positive relationship between environmental concern and the intention to use BRT. Furthermore, environmental concern mediates the effects of agreeableness, neuroticism, conscientiousness, openness to experience, and extraversion on the intention to use BRT during the COVID-19 pandemic.

### Current Research

This study was conducted in South Kalimantan, because after relying on conventional urban transportation such as *angkot* or public minivan for a long time, the South Kalimantan government finally developed modern public transportation. Currently, one of the most popular types of modern public transportation in the Province of South Kalimantan is the BRT of "Banjarbakula." The BRT is a pioneer of modern

public transportation with 11 buses and more than 37 bus stops in use since 2019 on the Banjarmasin-Banjarbaru city route (Subayu, 2020). The lack of studies on public transportation behavior during the pandemic makes this important. Several studies of public transportation behavior in Indonesia during the pre-pandemic period explained user dissatisfaction (Joewono et al., 2016), the intention to use public transportation (Abraham & Wirayudha, 2015), the choice of transportation modes (Bastarianto et al., 2019; Van et al., 2014), and the performance of public bus drivers (Suraji et al., 2017). Only Abraham and Wirayudha (2015) explain personal factors in the form of personality traits on the intention to use public transportation in Jakarta as a city with a well-developed public transportation system in Indonesia. Therefore, this current study focuses on the intention to use public transportation during the pandemic, especially in places that are still developing modern transportation modes, such as South Kalimantan. Furthermore, it explains the personality factors mediated by environmental concerns on the intention to use Banjarbakula BRT. It consists of the intention to use public transportation during pandemic; the Big Five traits; and environmental concern as an outcome, predictor, and mediator variable (see Figure 1).

### Methods

#### Participants

An online correlational survey was conducted on 19–26 March 2021, and data were collected using surveymonkey.com from 425 participants (Mean age = 19.770, SD = 1.635, range = 17–31). The majority were women (75.8%), currently attending school/college (90.6%), living in urban areas (81.9%), and never having used the



Banjarbakula BRT before (64.5%). A total of 89.7% live in two cities that are served by the Banjarbakula BRT service line, namely Banjarmasin and Banjarbaru. Meanwhile, 10.4% live in Martapura City closest to BRT services, and these three cities are located in South Kalimantan Province, Indonesia.

## Measures

### Intention to Use BRT

Participants' intention to use the Banjarbakula BRT during a pandemic was measured using two items with a correlation value of  $r = 0.641$ ,  $p < 0.001$  (e.g., 'During the COVID-19 pandemic, I intend to use the Banjarbakula BRT transportation again to go to work or study places/services and shopping centers/recreational places'). The answer choices for this measuring instrument ranged from 1 = Strongly disagree to 4 = Strongly agree.

### Environmental Concern

This study adapted the New Ecological Paradigm scale (NEP-15, Dunlap et al., 2000), and the translation was conducted by adopting the instrument from Beaton et al. (2000) into Indonesian. Furthermore, two items that have correlation values with a low total score were eliminated. This affected the quality of reliability, and in total, there were 13 statement items with good reliability,  $\alpha = 0.742$  (e.g., 'when the things that are happening now continue, a major ecological disaster will be faced'). The responses ranged from 1 = Strongly disagree to 4 = strongly agree.

### The Big Five Personality Traits

**Big Five Personality Traits.** This measuring instrument consists of the personality traits of agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience. The study uses the Indonesian version of the Big Five Inventory (BFI) of 28 items from Ramdhani (2012) adapted from John and Srivastava (1999). Among the five personality traits, a statement item was eliminated because the low quality of corrected item-total correlation in reliability test. Agreeableness consists of six valid items out of a total of seven items with reliability  $\alpha = 0.664$  (e.g., 'I am a forgiving person'). Conscientiousness consists of six items with reliability  $\alpha =$

0.727 (e.g., 'I am a reliable worker'). Extraversion consists of five items with reliability  $\alpha = 0.749$  (e.g., 'I am an enthusiastic person'). Neuroticism consists of four items with reliability  $\alpha = 0.781$  (e.g., 'I am a moody person'). Openness to experience consists of six items with reliability  $\alpha = 0.712$  (e.g., 'I am a person who often has new ideas'). The range reliability value of the five personality traits is from  $\alpha = 0.664$  to 0.781. The BFI uses 1 = Strongly disagree to 4 = strongly agree as the response scale.

### Control Variables

Five control variables were determined including concerns about public transportation, age, gender, place of residence, and ever/never having used BRT before. Before mediation model analysis, the variables that need to be controlled based on the results of the bivariate correlation test should be checked.

### **Concern about using public transportation.**

This study asked a statement item about 'The COVID-19 pandemic makes me anxious to take public transportation.' Responses 1 = strongly disagree to 4 = strongly agree.

**Demographic factors.** This study asked for several demographic factors, namely, age, gender (1 = male, 2 = female), place of residence (1 = Urban, 0 = Rural), whether they had taken BRT before (Public transportation (PT) user: 1 = user, 0 = not users).

### Statistical Analysis

Before conducting statistical analysis, it is necessary to check the quality of the data first. There is a missing value  $< 1\%$  of all items in all measuring instruments, and intervention was rendered using expectation maximization. Furthermore, data analysis started with the bivariate correlation of all variables. To address the hypotheses, the mediation regression model was performed using PROCESS macro in SPSS with 1,000 bootstrapping (Model 4, Hayes, 2018). We analyzed the five mediation regression models according to five personality traits. It also controls the covariate variables that are shown to affect the regression results. The covariate variables were determined from the results of the significant bivariate correlation test.

### **Results**

Enter to the next page

| Variables                            | Mean  | SD    | 1 | 2       | 3     | 4       | 5       | 6       | 7       | 8       | 9       | 10      | 11      | 12      |
|--------------------------------------|-------|-------|---|---------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. Age                               | 19.77 | 1.635 | - | -0.150* | 0.091 | 0.366** | -0.064  | 0.072   | -0.021  | 0.093   | 0.044   | -0.229* | 0.053   | 0.080   |
| 2. Gender                            | -     | -     | - | -       | 0.048 | 0.053   | 0.129** | -0.030  | 0.036   | -0.011  | 0.005   | 0.109*  | 0.016   | -0.012  |
| 3. Residence                         | 0.819 | 0.386 | - | -       | -     | 0.145** | 0.021   | 0.021   | 0.047   | 0.135** | 0.106*  | -0.086  | 0.074   | -0.032  |
| 4. BRT User                          | -     | -     | - | -       | -     | -       | -0.078  | 0.050   | -0.035  | 0.076   | 0.029   | -0.079  | 0.057   | 0.095   |
| 5. Concern to use PT in Pandemic     | 3.379 | 0.641 | - | -       | -     | -       | -       | 0.188** | 0.107*  | 0.108*  | 0.052   | 0.134** | 0.043   | -0.210* |
| 6. Environmental Concern             | 3.190 | 0.309 | - | -       | -     | -       | -       | -       | 0.303** | 0.256** | 0.207** | 0.043   | 0.262** | 0.140** |
| 7. Agreeableness                     | 3.160 | 0.381 | - | -       | -     | -       | -       | -       | -       | 0.449** | 0.433** | -0.107* | 0.335** | 0.002   |
| 8. Conscientiousness                 | 2.910 | 0.405 | - | -       | -     | -       | -       | -       | -       | -       | 0.502** | -0.228* | 0.485** | 0.08    |
| 9. Extraversion                      | 2.850 | 0.503 | - | -       | -     | -       | -       | -       | -       | -       | -       | -0.306* | 0.439** | 0.114*  |
| 10. Neuroticism                      | 2.890 | 0.543 | - | -       | -     | -       | -       | -       | -       | -       | -       | -       | -0.018  | -0.065  |
| 11. Openness to experience           | 2.930 | 0.392 | - | -       | -     | -       | -       | -       | -       | -       | -       | -       | -       | 0.095   |
| 12. Intention to use BRT in pandemic | 2.331 | .680  | - | -       | -     | -       | -       | -       | -       | -       | -       | -       | -       | -       |

Note: Gender: 1 = male, 2 = female; Residence: 1 = Urban, 0 = Rural; PT User: 1 = user, 0 = not user; \*\* p < .01; \* p < .05.



-0.210\*\*

0.680

0.01  
0.05

In the bivariate correlation test, concerns about using PT in the pandemic were negatively correlated to the intention to use BRT ( $r = -0.210$ ,  $p < 0.01$ ). This formed the control for the variable in the regression analysis of the mediation model. I found other control variables such as age, gender, place of residence, and ever/never having used BRT before, are not related to the intention to use BRT. Therefore, these variables are not included in the regression model as covariate variables. Among the independent variables measured (see Table 1), two were weakly correlated to the intention to use BRT in a pandemic, namely, environmental concern ( $r = 0.140$ ,  $p < 0.01$ ) and extraversion ( $r = 0.114$ ,  $p < 0.05$ ).

0.114 ←

In the regression analysis of the mediation model, five models were tested according to the number of independent variables of the five personality traits. The mediator variable in this analysis is an environmental concern. Meanwhile, the dependent variable is the intention to use PT in a pandemic. I set the score of concern about using PT in the pandemic as a covariate variable in the regression model. The results of the complete analysis can be seen in Table 2.

The five models showed that agreeableness ( $\beta = .236$ ,  $SE = .037$ ,  $t(424) = 6.212$ ,  $p < .001$ ), conscientiousness ( $\beta = .239$ ,  $SE = .036$ ,  $t(424) = 5.119$ ,  $p < .001$ ), extraversion ( $\beta = .198$ ,  $SE = .029$ ,  $t(424) = 4.226$ ,  $p < .001$ ), and openness to experience ( $\beta = .254$ ,  $SE = .036$ ,  $t(424) = 5.504$ ,  $p < .001$ ) significantly predicted environmental concern but not neuroticism ( $\beta = .018$ ,  $SE = .027$ ,  $t(424) = .377$ ,  $p = n.s.$ ). The five models also found that environmental concern significantly predicted positive intentions to use BRT (see Table 2 for detailed results).

Missing "zero" in front of dot.

In the results of the mediation model 1 test, environmental concern significantly mediates the relationship between agreeableness and the intention to use BRT ( $\beta = .056$ ,  $p < .05$ ,  $BootSE = .018$ ,  $BootCI$  95% [0.021, 0.093]). Similarly, model 2 showed that environmental concern significantly mediates the relationship between conscientiousness and the intention to use BRT ( $\beta = 0.041$ ,  $p < 0.05$ ,  $BootSE = .016$ ,  $BootCI$  95% [0.012, 0.075]). The previous model also found a significant mediating effect of environmental concern on the relationship between extraversion

and BRT use intentions in Model 3 ( $\beta = 0.033$ ,  $p < 0.05$ ,  $BootSE = 0.014$ ,  $BootCI$  95% [0.010, 0.067]). It mediates the significant relationship between openness to experience and the intention to use BRT in model 5 ( $\beta = 0.043$ ,  $p < 0.05$ ,  $BootSE = 0.017$ ,  $BootCI$  95% [0.012, 0.079]). All the mediation effects in models 1, 2, 3, and 5 are full positive mediation because the results of the analysis showed that the direct effect (coefficient value  $c$ ) from the independent to the dependent variable is not significant (see Table 2). Meanwhile, there is no significant mediating effect of environmental concern on the relationship between neuroticism and the intention to use BRT ( $\beta = 0.033$ ,  $p = n.s.$ ,  $BootSE = 0.010$ ,  $BootCI$  95% [-0.016, 0.024]).

A significant negative effect was also found from the control variable of the concern of using BRT during a pandemic in model 1 ( $\beta = -0.243$ ,  $SE = 0.051$ ,  $t(424) = -5.092$ ,  $p < 0.001$ ), model 2 ( $\beta = -0.248$ ,  $SE = 0.051$ ,  $t(424) = -5.212$ ,  $p < 0.001$ ), model 3 ( $\beta = -0.239$ ,  $SE = 0.036$ ,  $t(424) = 5.119$ ,  $p < 0.001$ ), model 4 ( $\beta = -0.239$ ,  $SE = 0.036$ ,  $t(424) = 5.119$ ,  $p < 0.001$ ), and model 5 ( $\beta = -0.239$ ,  $SE = 0.036$ ,  $t(424) = 5.119$ ,  $p < 0.001$ ). Therefore, the concern effect of using BRT can reduce the intention to use BRT in a pandemic. The right decision was made to control this using a covariate variable in the mediation regression model analysis.

## Discussion

The five personality traits were not significantly related to the intention to use BRT during the pandemic. On the total effect, there was a significant partial relationship of conscientiousness, extraversion, and openness to experience with the intention to use BRT without involving mediator variables in the regression estimation. Agreeableness, conscientiousness, extraversion, and openness to experience are partially related to environmental concerns. However, neuroticism is not significantly related, and across all models, environmental concern was significantly related to the intention to use BRT during the COVID-19 pandemic. An important finding was the proven effect of environmental concern mediation. The main hypothesis, environmental concern significantly mediates the relationship between personality traits of openness to experience, agreeableness, conscientiousness, and extra-



**Table 2.** Mediation analysis result of intention to use Public Transportation (Y)

|                                                              | Path coefficients ( $\beta$ ) |                 |                        | Indirect effect          |                                                           |
|--------------------------------------------------------------|-------------------------------|-----------------|------------------------|--------------------------|-----------------------------------------------------------|
|                                                              | Path a<br>(X→M)               | Path b<br>(M→Y) | Path c<br>(Total eff.) | Estimates<br>( $\beta$ ) | Confidence interval<br>95% of $\beta$<br>(Bbootstrapping) |
| Model 1 ( $R^2 = .078$ , $F(3, 421) = 11.901$ , $p < .001$ ) |                               |                 |                        |                          |                                                           |
| Agreeableness (X)                                            | 0.286(0.037)***               | 0.025(0.085)    | -0.031(0.088)          |                          |                                                           |
| Environmental concern (M)                                    |                               | 0.195(0.011)*** |                        |                          |                                                           |
| A → EC → IUPT                                                |                               |                 |                        | 0.056(0.018)*            | 0.021, 0.093                                              |
| Model 2 ( $R^2 = .081$ , $F(3, 421) = 12.366$ , $p < .001$ ) |                               |                 |                        |                          |                                                           |
| Conscientiousness (X)                                        | 0.239(0.036)***               | 0.104(0.080)*   | 0.063(0.081)           |                          |                                                           |
| Environmental concern (M)                                    |                               | 0.171(0.108)**  |                        |                          |                                                           |
| C → EC → IUPT                                                |                               |                 |                        | 0.041(0.016)*            | 0.012, 0.075                                              |
| Model 3 ( $R^2 = .085$ , $F(3, 421) = 13.099$ , $p < .001$ ) |                               |                 |                        |                          |                                                           |
| Extraversion (X)                                             | 0.198(0.029)***               | 0.125(0.064)**  | 0.092(0.065)           |                          |                                                           |
| Environmental concern (M)                                    |                               | 0.167(0.107)**  |                        |                          |                                                           |
| E → EC → IUPT                                                |                               |                 |                        | 0.033(0.014)*            | 0.010, 0.067                                              |
| Model 4 ( $R^2 = .079$ , $F(3, 421) = 12.039$ , $p < .001$ ) |                               |                 |                        |                          |                                                           |
| Neuroticism (X)                                              | 0.018(0.027)                  | -0.048(0.060)   | -0.041(0.059)          |                          |                                                           |
| Environmental concern (M)                                    |                               | 0.187(0.105)*** |                        |                          |                                                           |
| N → EC → IUPT                                                |                               |                 |                        | 0.003(0.010)             | -0.016, 0.024                                             |
| Model 5 ( $R^2 = .081$ , $F(3, 421) = 12.322$ , $p < .001$ ) |                               |                 |                        |                          |                                                           |
| Openness to experience (X)                                   | 0.254(0.036)***               | 0.104(0.082)*   | 0.060(0.084)           |                          |                                                           |
| Environmental concern (M)                                    |                               | 0.170(0.108)**  |                        |                          |                                                           |
| O → EC → IUPT                                                |                               |                 |                        | 0.043(0.017)*            | 0.011, 0.079                                              |

Notes: A = Agreeableness, C = Conscientiousness, E = Extraversion, N = Neuroticism, O = Openness to experience, EC = Environmental Concern, IUPT = Intention to Use Public Transportation, coefficients regression = standardized coefficient, \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

0.067  
0.079  
Missing zero before dot.

version (except neuroticism) with intention to use BRT, and the four indirect effects are found to be at a weak regression coefficient level. This result is supported by the average score of the BRT use intention variable which is at a low level (mean score = 2.331 on a scale of 1–4) (see Table 1).

The results of this study found that all direct effects of the five personality traits were not significantly related to the intention to use BRT. However, some total effects of personality traits were found to be significant in relation to the intention to use BRT. During the pandemic, agreeableness was not significantly related to the intention to use BRT (indirect and total effect) which is in line with the study conducted by Abraham and Wirayudha (2015). Conscientiousness did not affect the intention to use BRT directly, but the coefficient of total effect (without involving the mediator variable) was significant. Previous studies found a negative relationship between conscientiousness and the intention to use public transportation (Abraham & Wirayudha, 2015; Roos et al., 2020). Openness to experience does not have a direct relationship with the intention to use BRT. However, there is a significant total effect between this trait and intention when it does not involve the mediator variable. My study did not obtain a direct effect of extraversion on the intention to use BRT, but the coefficient of total effect (without involving a mediator) found a significant relationship. There was an insignificant relationship between neuroticism and the intention to use BRT during the pandemic (indirect effect and total effect) in line with the findings of Roos et al. (2020). However, this contrasts with the Matz and Harari (2010) study, where a positive relationship with the desire to spend time in transit was obtained (vehicle). During the pandemic, people restricted their movements and practiced social distancing, such as by avoiding PT, due to the potential for social interactions that could lead to the transmission of COVID-19. This means that there is another explanation that can account for why people with certain personality types are willing to use PT, and I believe environmental concern is the key variable.

The pandemic has both positive and negative impacts on the environment. One of the positive impacts is the restriction of transporta-

tion activities to reduce noise and air pollution (Rume & Islam, 2020). The pandemic affects the environment (Zambrano-Monserrate et al., 2020), and the lockdown that reduced mobility increased air quality rates in several countries (Muhammad et al., 2020; Sahraei et al., 2021). Furthermore, the pandemic increased environmental awareness (Ali et al., 2021; Severo et al., 2021). The survey results of Kachaner et al. (2020) of 3,000 people from several countries found that 70% of participants became more concerned with the environment than before the pandemic. The pandemic condition shows the effect of environmental concern to be significant on the intention to use PT. In addition, 76% of participants thought that environmental issues were as worrying as (or more worrying than) health problems during the COVID-19 pandemic (Kachaner et al., 2020). The findings explain that anxiety has a strong effect on reducing the intention to use BRT during a pandemic (a significant effect from the control variable). The state of anxiety during the pandemic reduced the sense of security in PT (Dong et al., 2021), and there was a tendency for PT users to develop a generalized anxiety disorder as a response to the pandemic (Kassaw & Pandey, 2022).

The analysis results prove that the mediating effect of environmental concern is not only evident in the relationship between neuroticism and the intention to use BRT, but other personality traits have a significant mediating effect. This study reported that people with high scores on agreeableness choose to use BRT when there is an environmental concern effect as a mediator. The use of PT can be classified as pro-environmental behavior. The findings of the mediating effect are in line with the studies of Basic-Sontic et al. (2017) and Poier (2021). One of the characteristics of agreeableness was an altruistic and warm or empathetic concern (Hirsh, 2010; Swami et al., 2010). Furthermore, altruism seems to be directed at others (Graziano & Habashi, 2010; Oda et al., 2014) and the environment (Schultz, 2001). It is believed that when a pandemic occurs, agreeable people need concern and altruism on environmental issues to decide on the use of PT. This is because one of the goals of using PT is to reduce the impact of air pollution or maintain environmental quality.

Furthermore, the results showed that envi-

ronmental concern positively mediated the relationship between conscientiousness and intention to use BRT. One of the most common domains was orderliness which includes the tendency of people to emphasize tidiness, cleanliness, and planning (Roberts et al., 2014). Furthermore, conscientious people have a “future time perspective” on planning (Przepiorka et al., 2020) and responsibilities (Roberts et al., 2014). This study assesses the mediating effect of environmental concern because people with high levels of conscientiousness perceive environmental conditions as a realistic plan and they feel the need to be responsible by using PT. Moreover, people feel more concerned about and responsible for environmental sustainability during a pandemic (see Ali et al., 2021; Severo et al., 2021).

The results showed that environmental concern positively mediates the relationship between extraversion and intention, but at a weak effect level, and one of the facets was sociability (John, 2021). People with high extraversion scores tend to rate the impact of air pollution on human health (Hirsh, 2014). It is suspected that environmental concerns arise due to awareness of the negative impacts related to air pollution. Furthermore, it makes people with high levels of extroversion choose to use PT, and this decision will certainly provide social benefits to others’ health.

People with the openness to experience personality type want to use BRT in a pandemic when environmental concerns have a significant effect as a mediator. In the context of pro-environmental behavior, the findings of the mediating effect were in line with Busic-Sontic et al. (2017) and Poier (2021). The characteristics of openness to experience were high curiosity (Costa & McCrae, 2011) and aesthetics related to nature (Silvia et al., 2015). These two traits made people with high levels of openness to improve their experience and evaluate their environment. Meanwhile, they become interested in using PT as a form of action to reduce the negative impact on nature after gaining knowledge about environmental conditions.

This personality trait did not significantly predict intention through the mediating effect of environmental concern. During a pandemic, the

need for safety and comfort becomes an important factor that determines the use of PT (Awad-Núñez et al., 2021; Przybyłowski et al., 2021). Furthermore, the COVID-19 pandemic has made people with high neuroticism scores prefer to practice social distancing (Ludeke et al., 2021). However, it is difficult to keep social distance on a public transport vehicle full of passengers. Closer contact increases the risk of exposure to the virus (Yezli & Khan, 2020), and this concern reduces the desire to use PT (Chang et al., 2021). For people with the neuroticism personality type, using PT is a daunting prospect.

The environmental concern factor has a weak effect both as a predictor and a mediator. This study is limited to only explaining environmental concerns and personality traits. This is because other possible factors affected the desire to use PT during the COVID-19 pandemic. Furthermore, it was limited to only a relatively new location using modern PT, the BRT Banjarkakula as my context study which started operating in 2019. Locations with an established and well-developed example of a PT system should be considered. The future researcher should examine the other PT modes including commuter trains, light rail transit, mass rapid transit, airplanes, and ferries. My research is limited to using a correlational survey approach, so it cannot generate causal explanations and has weaknesses in internal validity without a manipulated variable (Gravetter & Forzano, 2018). Therefore, I suggest that future researchers use experimental methods.

## Conclusion

Personality traits did not predict the intention to use BRT during the COVID-19 pandemic directly. Environmental concern was found to be positively related to intention. There was a full positive mediating effect on the relationship between four personality traits (agreeableness, conscientiousness, extraversion, and openness to experience) on intentions to use BRT. Meanwhile, environmental concern was not found to mediate the effects of neuroticism and the intention to use BRT significantly. During a pandemic, environmental concerns are important, because the use of PT will have a positive impact on improving the quality of the environment.

The findings provide advice on local policies related to PT and this includes promoting the use of PT by observing the information about positive impacts on the environment. In particular, people with neurotic personality traits are more likely to use public transportation if the safety systems is improved.

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**Data Availability Statement.** The dataset analyzed for this study can be found in the Open Science Foundation repository: [https://osf.io/cnq43/?view\\_only=1cc52a4cdba0412e8e1e86fd45f4c120](https://osf.io/cnq43/?view_only=1cc52a4cdba0412e8e1e86fd45f4c120)

**Informed Consent Statement.** Informed consent was obtained from all participants involved in the study.

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## MS #1136: Update submitted for "Personality and the Intention to use Bus Rapid Transit on Pandemic COVID-19: The role of environmental concern as a mediator"

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Psychological Research on Urban Society

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# Personality and the Intention to use Bus Rapid Transit on Pandemic COVID-19: The role of environmental concern as a mediator

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## Abstract

The COVID-19 pandemic has had an impact on the behavior of public transport users and raised concerns about the means of transportation. Therefore, this study aims to explain the mediating effect of environmental concern in the relationship between five personality traits on the intention to use Bus Rapid Transit (BRT) during the pandemic. A correlational survey of 425 participants was conducted, and the analysis found that all five personality traits did not directly predict the intention to use BRT. Furthermore, there was a positive mediating effect at the weak level of environmental concern on the relationship between four of the personality traits (agreeableness, conscientiousness, extraversion, and openness to experience) toward the intention to use BRT. The results showed that the mediating effect of environmental concern was not significant for the relationship between neuroticism and BRT usage intentions. It was reported that one of the reasons people use public transportation is due to environmental concerns during a pandemic.

## Keywords

Big Five Personality Traits, Environmental Concern, Public Transportation Use, Bus Rapid Transit, Pandemic

The COVID-19 pandemic has reduced the usage frequency of all transportation modes ten countries on six continents (Barbieri et al., 2021), by up to 90% (Przybylowski et al., 2021; Sahraei et al., 2021; Tirachini & Cats, 2020). Based on this condition, it is important to understand the behavior to use public transportation during the pandemic. Several studies explain the desire to pay (Awad-Núñez et al., 2021), safety, and comfort (Przybylowski et al., 2021), as well as behavior looking to maintain health protocols (Dzisi & Dei, 2020; Guellich et al., 2021). Currently, there

is a need to explain the practice of using public transportation during the COVID-19 pandemic (see Irawan et al., 2020), especially in terms of personal factors such as personality. The meta-analysis study of Zettler et al. (2022) found that differences in personality traits have varying effects on personal perception, behavioral adjustment, and societal evaluation.

There are still limited studies on travel behavior using public transportation during the COVID-19 pandemic in terms of personality factors. The general personality concept studied in the context of behavior using public transportation is the "Big Five Personality Traits" (Costa & McCrae, 2011). Furthermore, Asselmann et al. (2020) found a significant positive relationship between agreeableness and the reduction in the use of public transportation during the first week of the pandemic in Germany, while other traits were not significantly correlated. Another study conducted by Krupic et al. (2010) demon-

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strated positive and negative relationships between agreeableness and extraversion, respectively, and restrictions on the use of public transportation in Croatia, while other traits were not significantly correlated. In contrast to Asselmann et al. (2020) and Krupic et al. (2010) which examined the relationship between personality traits and restrictions on the use of public transportation in the pandemic era, I investigate the factors that might mediate the relationship between a given personality trait and the use of public transport in a pandemic.

Under nonpandemic conditions, many studies explain the role of personality factors in public transportation behavior (Abraham & Wirayudha, 2015; Anagnostopoulou et al., 2020; Gao et al., 2017; Roos et al., 2020; Yazdanpanah & Hosseinlou, 2017). Some previous findings have produced contradictory results on the relationship between personality traits and intention to use public transportation. For example, extraversion had a negative relationship (Roos et al., 2020), but, in contrast, Yazdanpanah and Hosseinlou (2017) found a positive relationship between extraversion and the intention to use public transportation. Contradictory results are also found on the conscientious trait; Abraham and Wirayudha (2015) and Roos et al. (2020) revealed a negative association between conscientiousness and the intention to use public transportation. Conversely, conscientious individuals more often use public transportation based on the cost of transportation expenses (Yazdanpanah & Hosseinlou, 2016). From the literature review, I also note inconsistent findings in the relationship between personality traits and the intention to use public transportation. Openness to experience (Roos et al., 2020), agreeableness (Roos et al., 2020; Stachl et al., 2017), and neuroticism (Yazdanpanah & Hosseinlou, 2017) had a significant correlation with the intention to use public transportation. Conversely, research in Indonesia found that these three traits did not predict the intention to use public transportation significantly (Abraham & Wirayudha, 2015).

Several inconsistent findings of the relationship between personality traits and the intention to use public transportation have the potential to need new explanations. Shadiqi et al. (2023) found that besides the comfort and accessibility

of public transportation, environmental concern predicted the use of public transportation. It is difficult to find previous findings that test the mediating effect of environmental concerns on the relationship between personality and public transportation use during a pandemic. Environmental concern was strongly related to attitudes toward the environment (Ibrahim et al., 2021). Attitudes toward the environment mediated the relationship between personality characteristics and responsible environmental behavior-related waste (Ojedokun, 2011). A study by Basic-Sontic et al. (2017) examined the mediating effect of environmental concern on the relationship between the Big Five Personality Traits and pro-environmental behavior during a non-pandemic period. I believe that the relationship patterns, as identified by Basic-Sontic et al. (2017), can apply to the use of public transportation. This is likely because, first, one form of pro-environmental behavior is the use of public transportation (Chan et al., 2023); and second, pandemic conditions can increase environmental concerns (Severo et al., 2021). I argue that environmental concern plays an important role in the relationship between personality traits and the intention to use public transportation. This study aims to provide answers regarding the mediation effect of environmental concerns on the relationship between personality factors and the intention to use public transportation during the COVID-19 pandemic. In this research, I employed Bus Rapid Transit (BRT) as a form of public transportation. BRT is an integrated bus transportation system that offers speed, comfort, and cost-effective in urban area (Wright, 2003).

### ***Personality Traits and Public Transportation Use***

In this study, I focus on explaining the use of public transportation. The availability of public transportation is one characteristic of sustainable urbanization (Zhang, 2016). Urban communities use public transportation for their daily mobility. The use public transportation behavior is kind of proenvironmental behavior (Ertz et al., 2016). Public transportation, as a sustainable mode of transportation, becomes a way to reduce energy consumption and environmental pollution (Lejda et al., 2017). In addition to its environmental benefits, public transportation is also a way to reduce the use of private transpor-

tation, which is prone to traffic accidents, such as the motorbike mode in Indonesia (Soehodho, 2017). In this study, I examine the determinant factors that make someone use public transportation, specifically BRT, and one of the factors is personality.

I chose the Big Five Personality Traits as the main predictor in this study. The factor theory of the Big Five Personality Traits is a structure of differences designed to explain individual development and functioning (McCrae, 2010). The five personality domains are called personality traits, namely (Costa & McCrae, 2011): (1) Extraversion: characterized by openness, easy closeness with others, being active, happiness to socialize, being optimistic, fun, affectionate, and friendly; (2) Agreeableness: characterized by being gentle, kind, helpful, always open and loving to others, very trustworthy, and easily deceived; (3) Conscientiousness: has a strong stance, well-organized ability, is orderly, credible and diligent; (4) Neuroticism: characterized by uncontrolled anxiety, increased anger levels, feelings of unease, often sad and not easy to get along with; (5) Openness to experiences: characterized by high curiosity, creativity, confidence, being imaginative, and always looking for novelty.

No research has been conducted to examine how personality traits relate to the use of public transportation during the COVID-19 pandemic, but this section does provide a review of studies that were carried out before the pandemic. Roos et al. (2020) conducted a study in 2017 and found that the personality trait dimensions of openness to experience and agreeableness had a positive relationship with the use of public transportation. Furthermore, conscientiousness and extraversion had a negative relationship with the use of public transportation in Sweden, while neuroticism had no significant relationship (Roos et al., 2020). Stachl et al. (2017) found that agreeable people used public transportation applications more often in smartphones in Munich. Before the COVID-19 pandemic, for users of public transportation in Jakarta, conscientiousness is the only personality dimension negatively significantly associated with the intention of using public transportation, and the other four traits are not significant (Abraham & Wirayudha, 2015). Another study in Iran before

the pandemic found a significant negative relationship between neuroticism and the intention to use public transportation, while extraversion was positively related to the intention (Yazdanpanah & Hosseinlou, 2017).

Based on the study of the Big Five Personality Traits theory and related scientific findings, the following hypotheses are proposed: Openness to experience, agreeableness, and extraversion are positively correlated with the intention to use BRT; neuroticism and conscientiousness are negatively correlated with the intention to use BRT in the COVID-19 pandemic.

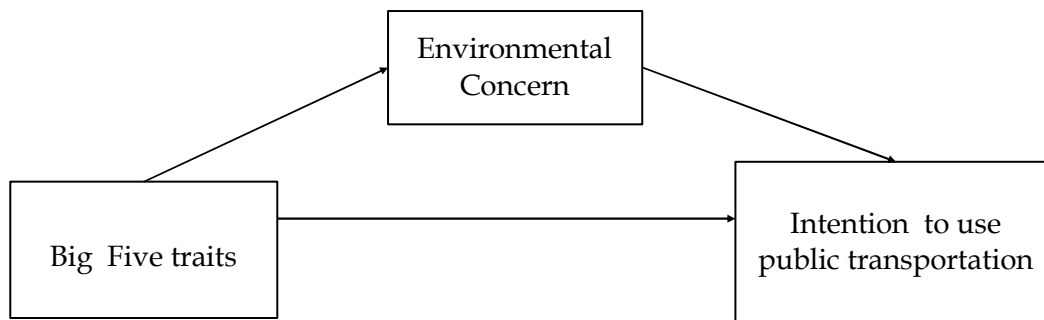
### *Environmental Concern*

Environmental concern is a person's attitude toward specific environment behavior or environmental value orientations (Cruz & Manata, 2020; Fransson & Gärling, 1999). Personality was found to be an important factor in determining environmental concern (Chen et al., 2020). In addition, several studies have found a positive relationship between neuroticism, conscientiousness (Abdollahi et al., 2017; Hirsh, 2010), agreeableness (Hirsh, 2010, 2014), openness to experience (Milfont & Sibley, 2012; Wuertz, 2015), and extraversion (Abdollahi et al., 2017) on environmental concern. Furthermore, it was hypothesized that openness to experience, agreeableness, conscientiousness, neuroticism, and extraversion are positively correlated with environmental concern.

Environmental concern is an antecedent of pro-environmental behavior related to the choice of transportation mode (Bouscasse et al., 2018; Daziano & Bolduc, 2013; Heath & Gifford, 2002; Ng & Phung, 2020), and people with a low level of concerns will tend to choose private transportation modes (Bouscasse et al., 2018). Donald et al. (2014) found that environmental concern was not significantly related to the intention to use private and public transportation. In different types of transportation modes, He et al. (2018) and Shalender and Sharma (2021) found that there is a relationship between environmental concern and the desire to use electric vehicles as a form of sustainable car transportation.

I argue that environmental concern has an effect as a mediator based on research on the relationship between personality traits and pro-

**Figure 1.** The analytical model framework to examine the mediating effect of environmental concern on the relationship between the Big Five Personality Traits and intentions to use the BRT



environmental behavior. Proenvironmental behavior allows people to achieve explicit goals for environmental benefits by doing something (Steg & de Groot, 2019). There is a positive mediating effect of environmental concern on certain personality traits (e.g., openness to experience and agreeableness) on pro-environmental behavior (Busic-Sontic et al., 2017). Environmental concern also negatively mediated extraversion and positively mediated neuroticism associated with green investment behavior (Busic-Sontic & Brick, 2018). Poier (2021) found the mediating effect of environmental concern on the relationship between openness to experience, agreeableness, and neuroticism on the adoption of solar energy in households. Busic-Sontic et al. (2017), Busic-Sontic and Brick (2018), and Poier (2021) have similarities in describing examples of pro-environmental behavior. One example of pro-environmental behavior on the private sphere is the use of public transportation (Ertz et al., 2016). Based on this explanation, it is hypothesized that there is a positive relationship between environmental concern and the intention to use BRT. Furthermore, environmental concern mediates the effects of agreeableness, neuroticism, conscientiousness, openness to experience, and extraversion on the intention to use BRT during the COVID-19 pandemic.

### Current Research

This study was conducted in South Kalimantan, because after relying on conventional urban transportation such as *angkot* or public minivan for a long time, the South Kalimantan government finally developed modern public transportation. Currently, one of the most popular types of modern public transportation in the Province of South Kalimantan is the BRT of "Banjarbakula." The BRT is a pioneer of modern

public transportation with 11 buses and more than 37 bus stops in use since 2019 on the Banjarmasin-Banjarbaru city route (Subayu, 2020). The lack of studies on public transportation behavior during the pandemic makes this important. Several studies of public transportation behavior in Indonesia during the pre-pandemic period explained user dissatisfaction (Joewono et al., 2016), the intention to use public transportation (Abraham & Wirayudha, 2015), the choice of transportation modes (Bastarianto et al., 2019; Van et al., 2014), and the performance of public bus drivers (Suraji et al., 2017). Only Abraham and Wirayudha (2015) explain personal factors in the form of personality traits on the intention to use public transportation in Jakarta as a city with a well-developed public transportation system in Indonesia. Therefore, this current study focuses on the intention to use public transportation during the pandemic, especially in places that are still developing modern transportation modes, such as South Kalimantan. Furthermore, it explains the personality factors mediated by environmental concerns on the intention to use Banjarbakula BRT. It consists of the intention to use public transportation during pandemic; the Big Five traits; and environmental concern as an outcome, predictor, and mediator variable (see Figure 1).

### Methods

#### Participants

An online correlational survey was conducted on 19–26 March 2021, and data were collected using surveymonkey.com from 425 participants (Mean age = 19.770, SD = 1.635, range = 17–31). The majority were women (75.8%), currently attending school/college (90.6%), living in urban areas (81.9%), and never having used the



Banjarbakula BRT before (64.5%). A total of 89.7% live in two cities that are served by the Banjarbakula BRT service line, namely Banjarmasin and Banjarbaru. Meanwhile, 10.4% live in Martapura City closest to BRT services, and these three cities are located in South Kalimantan Province, Indonesia.

## Measures

### Intention to Use BRT

Participants' intention to use the Banjarbakula BRT during a pandemic was measured using two items with a correlation value of  $r = 0.641$ ,  $p < 0.001$  (e.g., 'During the COVID-19 pandemic, I intend to use the Banjarbakula BRT transportation again to go to work or study places/services and shopping centers/recreational places'). The answer choices for this measuring instrument ranged from 1 = Strongly disagree to 4 = Strongly agree.

### Environmental Concern

This study adapted the New Ecological Paradigm scale (NEP-15, Dunlap et al., 2000), and the translation was conducted by adopting the instrument from Beaton et al. (2000) into Indonesian. Furthermore, two items that have correlation values with a low total score were eliminated. This affected the quality of reliability, and in total, there were 13 statement items with good reliability,  $\alpha = 0.742$  (e.g., 'when the things that are happening now continue, a major ecological disaster will be faced'). The responses ranged from 1 = Strongly disagree to 4 = strongly agree.

### The Big Five Personality Traits

**Big Five Personality Traits.** This measuring instrument consists of the personality traits of agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience. The study uses the Indonesian version of the Big Five Inventory (BFI) of 28 items from Ramdhani (2012) adapted from John and Srivastava (1999). Among the five personality traits, a statement item was eliminated because the low quality of corrected item-total correlation in reliability test. Agreeableness consists of six valid items out of a total of seven items with reliability  $\alpha = 0.664$  (e.g., 'I am a forgiving person'). Conscientiousness consists of six items with reliability  $\alpha =$

0.727 (e.g., 'I am a reliable worker'). Extraversion consists of five items with reliability  $\alpha = 0.749$  (e.g., 'I am an enthusiastic person'). Neuroticism consists of four items with reliability  $\alpha = 0.781$  (e.g., 'I am a moody person'). Openness to experience consists of six items with reliability  $\alpha = 0.712$  (e.g., 'I am a person who often has new ideas'). The range reliability value of the five personality traits is from  $\alpha = 0.664$  to 0.781. The BFI uses 1 = Strongly disagree to 4 = strongly agree as the response scale.

### Control Variables

Five control variables were determined including concerns about public transportation, age, gender, place of residence, and ever/never having used BRT before. Before mediation model analysis, the variables that need to be controlled based on the results of the bivariate correlation test should be checked.

### **Concern about using public transportation.**

This study asked a statement item about 'The COVID-19 pandemic makes me anxious to take public transportation.' Responses 1 = strongly disagree to 4 = strongly agree.

**Demographic factors.** This study asked for several demographic factors, namely, age, gender (1 = male, 2 = female), place of residence (1 = Urban, 0 = Rural), whether they had taken BRT before (Public transportation (PT) user: 1 = user, 0 = not users).

### Statistical Analysis

Before conducting statistical analysis, it is necessary to check the quality of the data first. There is a missing value  $< 1\%$  of all items in all measuring instruments, and intervention was rendered using expectation maximization. Furthermore, data analysis started with the bivariate correlation of all variables. To address the hypotheses, the mediation regression model was performed using PROCESS macro in SPSS with 1,000 bootstrapping (Model 4, Hayes, 2018). We analyzed the five mediation regression models according to five personality traits. It also controls the covariate variables that are shown to affect the regression results. The covariate variables were determined from the results of the significant bivariate correlation test.



**Table 1.** Bivariate correlation variables

| Variables                            | Mean  | SD    | 1 | 2        | 3     | 4       | 5       | 6       | 7       | 8       | 9       | 10       | 11      | 12       |
|--------------------------------------|-------|-------|---|----------|-------|---------|---------|---------|---------|---------|---------|----------|---------|----------|
| 1. Age                               | 19.77 | 1.635 | - | -0.150** | 0.091 | 0.366** | -0.064  | 0.072   | -0.021  | 0.093   | 0.044   | -0.229** | 0.053   | 0.080    |
| 2. Gender                            | -     | -     | - | -        | 0.048 | 0.053   | 0.129** | -0.030  | 0.036   | -0.011  | 0.005   | 0.109*   | 0.016   | -0.012   |
| 3. Residence                         | 0.819 | 0.386 | - | -        | -     | 0.145** | 0.021   | 0.021   | 0.047   | 0.135** | 0.106*  | -0.086   | 0.074   | -0.032   |
| 4. BRT User                          | -     | -     | - | -        | -     | -       | -0.078  | 0.050   | -0.035  | 0.076   | 0.029   | -0.079   | 0.057   | 0.095    |
| 5. Concern to use PT in Pandemic     | 3.379 | 0.641 | - | -        | -     | -       | -       | 0.188** | 0.107*  | 0.108*  | 0.052   | 0.134**  | 0.043   | -0.210** |
| 6. Environmental Concern             | 3.190 | 0.309 | - | -        | -     | -       | -       | -       | 0.303** | 0.256** | 0.207** | 0.043    | 0.262** | 0.140**  |
| 7. Agreeableness                     | 3.160 | 0.381 | - | -        | -     | -       | -       | -       | -       | 0.449** | 0.433** | -0.107*  | 0.335** | 0.002    |
| 8. Conscientiousness                 | 2.910 | 0.405 | - | -        | -     | -       | -       | -       | -       | -       | 0.502** | -0.238** | 0.485** | 0.08     |
| 9. Extraversion                      | 2.850 | 0.503 | - | -        | -     | -       | -       | -       | -       | -       | -       | -0.308** | 0.439** | 0.114*   |
| 10. Neuroticism                      | 2.890 | 0.543 | - | -        | -     | -       | -       | -       | -       | -       | -       | -        | -0.018  | -0.065   |
| 11. Openness to experience           | 2.930 | 0.392 | - | -        | -     | -       | -       | -       | -       | -       | -       | -        | -       | 0.095    |
| 12. Intention to use BRT in pandemic | 2.331 | 0.680 | - | -        | -     | -       | -       | -       | -       | -       | -       | -        | -       | -        |

Note: Gender: 1 = male, 2 = female; Residence: 1 = Urban, 0 = Rural; PT User: 1 = user, 0 = not user; \*\*  $p < 0.01$ , \*  $p < 0.05$ .

## Results

In the bivariate correlation test, concerns about using PT in the pandemic were negatively correlated to the intention to use BRT ( $r = -0.210$ ,  $p < 0.01$ ). This formed the control for the variable in the regression analysis of the mediation model. I found other control variables such as age, gender, place of residence, and ever/never having used BRT before, are not related to the intention to use BRT. Therefore, these variables are not included in the regression model as covariate variables. Among the independent variables measured (see Table 1), two were weakly correlated to the intention to use BRT in a pandemic, namely, environmental concern ( $r = 0.140$ ,  $p < 0.01$ ) and extraversion ( $r = 0.114$ ,  $p < 0.05$ ).

In the regression analysis of the mediation model, five models were tested according to the number of independent variables of the five personality traits. The mediator variable in this analysis is an environmental concern. Meanwhile, the dependent variable is the intention to use PT in a pandemic. I set the score of concern about using PT in the pandemic as a covariate variable in the regression model. The results of the complete analysis can be seen in Table 2.

The five models showed that agreeableness ( $\beta = 0.286$ ,  $SE = 0.037$ ,  $t(424) = 6.212$ ,  $p < 0.001$ ), conscientiousness ( $\beta = 0.239$ ,  $SE = 0.036$ ,  $t(424) = 5.119$ ,  $p < 0.001$ ), extraversion ( $\beta = 0.198$ ,  $SE = 0.029$ ,  $t(424) = 4.226$ ,  $p < .001$ ), and openness to experience ( $\beta = 0.254$ ,  $SE = 0.036$ ,  $t(424) = 5.504$ ,  $p < 0.001$ ) significantly predicted environmental concern but not neuroticism ( $\beta = 0.018$ ,  $SE = 0.027$ ,  $t(424) = 0.377$ ,  $p = n.s.$ ). The five models also found that environmental concern significantly predicted positive intentions to use BRT (see Table 2 for detailed results).

In the results of the mediation model 1 test, environmental concern significantly mediates the relationship between agreeableness and the intention to use BRT ( $\beta = 0.056$ ,  $p < 0.05$ ,  $BootSE = 0.018$ ,  $BootCI$  95% [0.021, 0.093]). Similarly, model 2 showed that environmental concern significantly mediates the relationship between conscientiousness and the intention to use BRT ( $\beta = 0.041$ ,  $p < 0.05$ ,  $BootSE = 0.016$ ,  $BootCI$  95% [0.012, 0.075]). The previous model also found a

significant mediating effect of environmental concern on the relationship between extraversion and BRT use intentions in Model 3 ( $\beta = 0.033$ ,  $p < 0.05$ ,  $BootSE = 0.014$ ,  $BootCI$  95% [0.010, 0.067]). It mediates the significant relationship between openness to experience and the intention to use BRT in model 5 ( $\beta = 0.043$ ,  $p < 0.05$ ,  $BootSE = 0.017$ ,  $BootCI$  95% [0.012, 0.079]). All the mediation effects in models 1, 2, 3, and 5 are full positive mediation because the results of the analysis showed that the direct effect (coefficient value  $c$ ) from the independent to the dependent variable is not significant (see Table 2). Meanwhile, there is no significant mediating effect of environmental concern on the relationship between neuroticism and the intention to use BRT ( $\beta = 0.033$ ,  $p = n.s.$ ,  $BootSE = 0.010$ ,  $BootCI$  95% [-0.016, 0.024]).

A significant negative effect was also found from the control variable of the concern of using BRT during a pandemic in model 1 ( $\beta = -0.243$ ,  $SE = 0.051$ ,  $t(424) = -5.092$ ,  $p < 0.001$ ), model 2 ( $\beta = -0.248$ ,  $SE = 0.051$ ,  $t(424) = -5.212$ ,  $p < 0.001$ ), model 3 ( $\beta = -0.239$ ,  $SE = 0.036$ ,  $t(424) = 5.119$ ,  $p < 0.001$ ), model 4 ( $\beta = -0.239$ ,  $SE = 0.036$ ,  $t(424) = 5.119$ ,  $p < 0.001$ ), and model 5 ( $\beta = -0.239$ ,  $SE = 0.036$ ,  $t(424) = 5.119$ ,  $p < 0.001$ ). Therefore, the concern effect of using BRT can reduce the intention to use BRT in a pandemic. The right decision was made to control this using a covariate variable in the mediation regression model analysis.

## Discussion

The five personality traits were not significantly related to the intention to use BRT during the pandemic. On the total effect, there was a significant partial relationship of conscientiousness, extraversion, and openness to experience with the intention to use BRT without involving mediator variables in the regression estimation. Agreeableness, conscientiousness, extraversion, and openness to experience are partially related to environmental concerns. However, neuroticism is not significantly related, and across all models, environmental concern was significantly related to the intention to use BRT during the COVID-19 pandemic. An important finding was the proven effect of environmental concern mediation. The main hypothesis, environmental concern significantly mediates the relationship

**Table 2.** Mediation analysis result of intention to use Public Transportation (Y)

|                                                          | Path coefficients ( $\beta$ ) |                 |                        | Indirect effect          |                                                   |
|----------------------------------------------------------|-------------------------------|-----------------|------------------------|--------------------------|---------------------------------------------------|
|                                                          | Path a<br>(X→M)               | Path b<br>(M→Y) | Path c<br>(Total eff.) | Estimates<br>( $\beta$ ) | Confidence interval 95%<br>of $\beta$ (Bootstrap) |
| Model 1 ( $R^2 = 0.078, F(3, 421) = 11.901, p < 0.001$ ) |                               |                 |                        |                          |                                                   |
| Agreeableness (X)                                        | 0.286(0.037)***               |                 | 0.025(0.085)           | -0.031(0.088)            |                                                   |
| Environmental concern (M)                                |                               | 0.195(0.011)*** |                        |                          |                                                   |
| A → EC → IUPT                                            |                               |                 |                        | 0.056(0.018)*            | 0.021, 0.093                                      |
| Model 2 ( $R^2 = 0.081, F(3, 421) = 12.366, p < 0.001$ ) |                               |                 |                        |                          |                                                   |
| Conscientiousness (X)                                    | 0.239(0.036)***               |                 | 0.104(0.080)*          | 0.063(0.081)             |                                                   |
| Environmental concern (M)                                |                               | 0.171(0.108)**  |                        |                          |                                                   |
| C → EC → IUPT                                            |                               |                 |                        | 0.041(0.016)*            | 0.012, 0.075                                      |
| Model 3 ( $R^2 = 0.085, F(3, 421) = 13.099, p < 0.001$ ) |                               |                 |                        |                          |                                                   |
| Extraversion (X)                                         | 0.198(0.029)***               |                 | 0.125(0.064)**         | 0.092(0.065)             |                                                   |
| Environmental concern (M)                                |                               | 0.167(0.107)**  |                        |                          |                                                   |
| E → EC → IUPT                                            |                               |                 |                        | 0.033(0.014)*            | 0.010, 0.067                                      |
| Model 4 ( $R^2 = 0.079, F(3, 421) = 12.039, p < 0.001$ ) |                               |                 |                        |                          |                                                   |
| Neuroticism (X)                                          | 0.018(0.027)                  |                 | -0.048(0.060)          | -0.041(0.059)            |                                                   |
| Environmental concern (M)                                |                               | 0.187(0.105)*** |                        |                          |                                                   |
| N → EC → IUPT                                            |                               |                 |                        | 0.003(0.010)             | -0.016, 0.024                                     |
| Model 5 ( $R^2 = 0.081, F(3, 421) = 12.322, p < 0.001$ ) |                               |                 |                        |                          |                                                   |
| Openness to experience (X)                               | 0.254(0.036)***               |                 | 0.104(0.082)*          | 0.060(0.084)             |                                                   |
| Environmental concern (M)                                |                               | 0.170(0.108)**  |                        |                          |                                                   |
| O → EC → IUPT                                            |                               |                 |                        | 0.043(0.017)*            | 0.012, 0.079                                      |

Notes: A = Agreeableness, C = Conscientiousness, E = Extraversion, N = Neuroticism, O = Openness to experience, EC = Environmental Concern, IUPT = Intention to Use Public Transportation, coefficients regression = standardized coefficient, \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

between personality traits of openness to experience, agreeableness, conscientiousness, and extraversion (except neuroticism) with intention to use BRT, and the four indirect effects are found to be at a weak regression coefficient level. This result is supported by the average score of the BRT use intention variable which is at a low level (mean score = 2.331 on a scale of 1–4) (see Table 1).

The results of this study found that all direct effects of the five personality traits were not significantly related to the intention to use BRT. However, some total effects of personality traits were found to be significant in relation to the intention to use BRT. During the pandemic, agreeableness was not significantly related to the intention to use BRT (indirect and total effect) which is in line with the study conducted by Abraham and Wirayudha (2015). Conscientiousness did not affect the intention to use BRT directly, but the coefficient of total effect (without involving the mediator variable) was significant. Previous studies found a negative relationship between conscientiousness and the intention to use public transportation (Abraham & Wirayudha, 2015; Roos et al., 2020). Openness to experience does not have a direct relationship with the intention to use BRT. However, there is a significant total effect between this trait and intention when it does not involve the mediator variable. My study did not obtain a direct effect of extraversion on the intention to use BRT, but the coefficient of total effect (without involving a mediator) found a significant relationship. There was an insignificant relationship between neuroticism and the intention to use BRT during the pandemic (indirect effect and total effect) in line with the findings of Roos et al. (2020). However, this contrasts with the Matz and Harari (2010) study, where a positive relationship with the desire to spend time in transit was obtained (vehicle). During the pandemic, people restricted their movements and practiced social distancing, such as by avoiding PT, due to the potential for social interactions that could lead to the transmission of COVID-19. This means that there is another explanation that can account for why people with certain personality types are willing to use PT, and I believe environmental concern is the key variable.

The pandemic has both positive and nega-

tive impacts on the environment. One of the positive impacts is the restriction of transportation activities to reduce noise and air pollution (Rume & Islam, 2020). The pandemic affects the environment (Zambrano-Monserrate et al., 2020), and the lockdown that reduced mobility increased air quality rates in several countries (Muhammad et al., 2020; Sahraei et al., 2021). Furthermore, the pandemic increased environmental awareness (Ali et al., 2021; Severo et al., 2021). The survey results of Kachaner et al. (2020) of 3,000 people from several countries found that 70% of participants became more concerned with the environment than before the pandemic. The pandemic condition shows the effect of environmental concern to be significant on the intention to use PT. In addition, 76% of participants thought that environmental issues were as worrying as (or more worrying than) health problems during the COVID-19 pandemic (Kachaner et al., 2020). The findings explain that anxiety has a strong effect on reducing the intention to use BRT during a pandemic (a significant effect from the control variable). The state of anxiety during the pandemic reduced the sense of security in PT (Dong et al., 2021), and there was a tendency for PT users to develop a generalized anxiety disorder as a response to the pandemic (Kassaw & Pandey, 2022).

The analysis results prove that the mediating effect of environmental concern is not only evident in the relationship between neuroticism and the intention to use BRT, but other personality traits have a significant mediating effect. This study reported that people with high scores on agreeableness choose to use BRT when there is an environmental concern effect as a mediator. The use of PT can be classified as pro-environmental behavior. The findings of the mediating effect are in line with the studies of Basic-Sontic et al. (2017) and Poier (2021). One of the characteristics of agreeableness was an altruistic and warm or empathetic concern (Hirsh, 2010; Swami et al., 2010). Furthermore, altruism seems to be directed at others (Graziano & Habashi, 2010; Oda et al., 2014) and the environment (Schultz, 2001). It is believed that when a pandemic occurs, agreeable people need concern and altruism on environmental issues to decide on the use of PT. This is because one of the goals of using PT is to reduce the impact of air pollu-

tion or maintain environmental quality.

Furthermore, the results showed that environmental concern positively mediated the relationship between conscientiousness and intention to use BRT. One of the most common domains was orderliness which includes the tendency of people to emphasize tidiness, cleanliness, and planning (Roberts et al., 2014). Furthermore, conscientious people have a “future time perspective” on planning (Przepiorka et al., 2020) and responsibilities (Roberts et al., 2014). This study assesses the mediating effect of environmental concern because people with high levels of conscientiousness perceive environmental conditions as a realistic plan and they feel the need to be responsible by using PT. Moreover, people feel more concerned about and responsible for environmental sustainability during a pandemic (see Ali et al., 2021; Severo et al., 2021).

The results showed that environmental concern positively mediates the relationship between extraversion and intention, but at a weak effect level, and one of the facets was sociability (John, 2021). People with high extraversion scores tend to rate the impact of air pollution on human health (Hirsh, 2014). It is suspected that environmental concerns arise due to awareness of the negative impacts related to air pollution. Furthermore, it makes people with high levels of extroversion choose to use PT, and this decision will certainly provide social benefits to others' health.

People with the openness to experience personality type want to use BRT in a pandemic when environmental concerns have a significant effect as a mediator. In the context of pro-environmental behavior, the findings of the mediating effect were in line with Busic-Sontic et al. (2017) and Poier (2021). The characteristics of openness to experience were high curiosity (Costa & McCrae, 2011) and aesthetics related to nature (Silvia et al., 2015). These two traits made people with high levels of openness to improve their experience and evaluate their environment. Meanwhile, they become interested in using PT as a form of action to reduce the negative impact on nature after gaining knowledge about environmental conditions.

This personality trait did not significantly

predict intention through the mediating effect of environmental concern. During a pandemic, the need for safety and comfort becomes an important factor that determines the use of PT (Awad-Núñez et al., 2021; Przybylowski et al., 2021). Furthermore, the COVID-19 pandemic has made people with high neuroticism scores prefer to practice social distancing (Ludeke et al., 2021). However, it is difficult to keep social distance on a public transport vehicle full of passengers. Closer contact increases the risk of exposure to the virus (Yezli & Khan, 2020), and this concern reduces the desire to use PT (Chang et al., 2021). For people with the neuroticism personality type, using PT is a daunting prospect.

The environmental concern factor has a weak effect both as a predictor and a mediator. This study is limited to only explaining environmental concerns and personality traits. This is because other possible factors affected the desire to use PT during the COVID-19 pandemic. Furthermore, it was limited to only a relatively new location using modern PT, the BRT Banjarkakula as my context study which started operating in 2019. Locations with an established and well-developed example of a PT system should be considered. The future researcher should examine the other PT modes including commuter trains, light rail transit, mass rapid transit, airplanes, and ferries. My research is limited to using a correlational survey approach, so it cannot generate causal explanations and has weaknesses in internal validity without a manipulated variable (Gravetter & Forzano, 2018). Therefore, I suggest that future researchers use experimental methods.

## Conclusion

Personality traits did not predict the intention to use BRT during the COVID-19 pandemic directly. Environmental concern was found to be positively related to intention. There was a full positive mediating effect on the relationship between four personality traits (agreeableness, conscientiousness, extraversion, and openness to experience) on intentions to use BRT. Meanwhile, environmental concern was not found to mediate the effects of neuroticism and the intention to use BRT significantly. During a pandemic, environmental concerns are important, be-

cause the use of PT will have a positive impact on improving the quality of the environment. The findings provide advice on local policies related to PT and this includes promoting the use of PT by observing the information about positive impacts on the environment. In particular, people with neurotic personality traits are more likely to use public transportation if the safety systems is improved.

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**Data Availability Statement.** The dataset analyzed for this study can be found in the Open Science Foundation repository: [https://osf.io/cnq43/?view\\_only=1cc52a4cdba0412e8e1e86fd45f4c120](https://osf.io/cnq43/?view_only=1cc52a4cdba0412e8e1e86fd45f4c120)

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