How Goal-Framing Influences Attitudes towards Cargo Bike-Sharing Systems

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Abstract

In the process of becoming sustainable cities, many cities are now looking at ways to reduce car use with the aim to reduce CO_2 emissions and air pollution. Cargo bike-sharing systems can come as a solution, as they offer an alternative, sustainable mode of transportation. In this study, we aimed to explain people's attitude towards cargo bike-sharing and their intention to engage in cargo bike-sharing systems, using Goal-Framing Theory. Participants ($n = 83$) completed a questionnaire where they were asked about personal values and opinions. We aimed to manipulate their goal-frames by presenting them with differently framed texts about cargo bike-sharing. In the control condition, participants were only presented with neutral information about cargo bike-sharing, participants in the hedonic condition were provided with both neutral and hedonically framed information and participants in the biospheric condition were provided with both neutral and biospherically framed information. Afterwards, we asked everyone's opinions on cargo bike-sharing systems and whether they intended to use such systems. Our results showed no significant difference between the three groups. Therefore, our research is not supportive of previous research and existing literature on Goal-Framing Theory. Moreover, results showed that when those in the hedonic group had higher hedonic values, this did not influence their attitude towards cargo bike-sharing, which is not supportive of previous literature on goal-framing and values. Lastly, results showed a significant positive relationship between attitude towards cargo bike-sharing systems and intention to use such systems, thereby supporting previous literature.

Keywords: cargo bike-sharing, goal-framing, values

How Goal-Framing Influences Attitudes towards Cargo Bike-Sharing Systems

The transportation industry produces 23% of the greenhouse emissions, thereby taking a big share in the responsibility for climate change (IPCC, 2014). Transportation also causes air pollution and noise, which is mainly in cities a serious problem. To help reduce greenhouse emissions and to lower air pollution and noise on a local level, many cities are working hard towards becoming sustainable cities. In a society that relies largely on (efficient) transportation of goods, this means it is necessary to look at different, cleaner modes of transportation. A shift is needed from a wide use of environmentally harmful vehicles towards the use of electric vehicles and bikes, oftentimes referred to as sustainable mobility (Litman, 2017).

Cargo bikes have been introduced in multiple cities to substitute cars and delivery vans as modes of transport. They can help reduce CO_2 emissions in the transportation industry, while simultaneously reducing noise. A serious advantage that they have over electric vans is that they can lead towards a safer traffic environment. However, cargo bikes are expensive and even though they are smaller than vans they still take up some space, so it would be unrealistic as well as undesirable for everyone to buy a cargo bike themselves. Cargo bike-sharing systems can come as a solution. In different cities in Europe, cargo bike-sharing systems have been introduced. These systems differ from free-floating systems to systems with fixed parking stations or hosts, and can be either donation-based or fee-based. Cargo bikes can be used by companies and organisations but also by private users, who could use them for the transport of children, furniture, or bigger purchases. Theoretically, the introduction of cargo bike-sharing systems in cities could result in individuals using cargo bikes instead of cars for transporting goods. Customers would also have the possibility not to order large-sized products, but instead pick them up at the store by themselves using a cargo bike. Nevertheless, cargo bikes might not always be seen as the best or most efficient option.

Therefore, in the present study, we are investigating who might participate in a cargo bike-sharing system and how presenting people with different kinds of information about cargo bike-sharing systems might influence their attitude towards such systems.

The Sharing Economy

As cargo bike-sharing is a relatively new concept, the literature on the subject is limited. Existing literature primarily focuses on behaviour of (potential) users of cargo bike-sharing systems (Becker & Rudolf, 2018; Hess & Schubert, 2019). However, the underlying psychology of motivations for people to engage in cargo bike-sharing systems remains rather unexplored.

The success of the sharing economy can depend on different motives. Bocker and Meelen (2017) suggested three motives for consumers to engage in the sharing economy, namely economic, environmental, and social motivations. Sharing goods is more sustainable as it reduces consumption and production of goods. As apparent by recent movements such as Friday for Future and growing climate demonstrations, for a lot of people environmental consciousness has grown, being the main reason for them to engage in sharing systems (Cohen & Kietzman, 2014). Sharing goods might be more beneficial to many individuals than buying them, because of time or financial considerations. Such self-interested motivations were in several studies reported as most significant in making the choice to participate in a sharing service (Hamari et al., 2016; Bardhi & Eckhart, 2012). In some sharing systems social motives play a role, such as in tool sharing which could stimulate contact with neighbours, or apartment sharing which could stimulate contact with locals (Agyeman et al., 2013; Tussyadiah, 2016). Whether this is the case remains to be seen for cargo bike-sharing systems.

Motivations to participate in bike-sharing might be different from those to participate in other sharing services. Self-interested motivations that are not economically driven might

play an important role as well. In several studies on regular bike-sharing, convenience has been reported as a major motivation in the participation in the bike sharing system (Fishman et al., 2013; LDA Consulting, 2013) and proximity of docking stations to work, health benefits and fun had been reported as a motivating factor by users of a bike-sharing system (Fishman et al., 2014). Accordingly, perceived ease of use was in several studies shown to significantly affect user satisfaction (Zhanyou et al., 2020) and intention to (continue to) use the bike-sharing systems (Zhanyou et al., 2020; Yu et al., 2018). In a Swiss study on cargo bike-sharing systems, the sharing procedure was reported as an important barrier to engage in the system (Hess & Schubert, 2019). Specific barriers named by participants were that it was too much effort, too costly and inconvenient.

Goal-Framing Theory

Goal-Framing Theory offers a framework that categorizes different motivations for pro-environmental behaviour. Goal-Framing Theory proposes that pro-environmental behaviour depends on the type of goals one pursues, these goals being either egoistic, hedonic, or normative (Lindenberg & Steg, 2007). Every person is thought to pursue all goals to some extent, their strength depending on personal values (Steg et al., 2014a) as well as on the situation (Steg et al., 2014b). Individuals in an egoistic goal frame will attend to subgoals that help improve or retain their resources (Lindenberg & Steg, 2007). When pro-environmental behaviour threatens to lower or impair their resources, they will be less likely to engage in such behaviours. However, when pro-environmental behaviour is less costly than the alternative, environmentally harmful behaviour, it would improve their resources. Therefore, low-cost pro-environmental behaviour can be appealing to those with egoistic goal frames. In regular bike share programs, financial savings are often found to be important motivations for users to engage in such programmes, mainly for lower income users (LDA

Consulting, 2013; Ogilvie & Goodwin, 2012).

Individuals in a hedonic goal frame attend to subgoals that are pleasurable and effortless (Lindenberg & Steg, 2007). When pro-environmental behaviour is more effortful or less pleasurable than the alternative behaviour that would harm the environment, those with hedonic goal frames will be less likely to engage in the environmentally friendly behaviour and rather go for the easier or more pleasurable alternative. However, pro-environmental behaviours can be effortless and pleasurable, being a possible reason for those in a hedonic goal to execute them. It has been shown that when pro-environmental behaviour is seen as pleasurable and fun, people are more likely to engage in such behaviours (De Groot & Steg, 2010). Hence, hedonic values do not necessarily have to inhibit pro-environmental behaviours and can instead be supportive of such behaviours. In a previous study on behaviours of (potential) users of a cargo bike-sharing system, hedonic aspects were named as important barriers to engage in the system (Hess & Schubert, 2019).

Individuals in a normative goal frame tend to focus on subgoals that they feel are appropriate, something that they ought to do (Lindenberg & Steg, 2007). Pro-environmental behaviours are often viewed as morally correct, therefore they are directly associated with fulfilling normative goals. Research on a regular bike-sharing system shows that environmental factors played a motivating factor to engage in the system (Fishman et al., 2014). In a study on cargo bike-sharing, it was found that 92% of the users were either "rather" or "very" concerned about climate change (Becker & Rudolf, 2018), suggesting that people who are concerned about the environment might be more motivated to engage in such sharing systems.

In line with Goal-Framing Theory, we expect different goal frames to influence attitudes towards cargo bike-sharing differently. We will compare the influence on attitudes towards cargo bike-sharing between a biospheric goal frame, a hedonic goal frame and no

goal frame. By describing cargo bike-sharing as environmentally friendly, we aim to activate the normative goal-frame, which we expect to influence the attitude towards cargo bike-sharing the most as pro-environmental behaviour is directly linked to the fulfilment of normative goals. By describing cargo bike-sharing as pleasurable and convenient, we aim to activate a hedonic goal-frame. Pro-environmental behaviour is usually not directly linked to fulfilment of hedonic goals, as often there is a more pleasurable or convenient alternative. Therefore, we expect that the hedonic framing of cargo bike-sharing will have a more positive influence on attitude towards cargo bike-sharing compared to when we do not strengthen a particular goal frame, though the effect will not be as strong as in the normative goal frame. Following Goal-Framing Theory and previous literature, we propose the following hypotheses:

Hypothesis 1: People provided with biospheric information will show a more positive attitude towards cargo bike-sharing compared to people provided with a hedonic or no goal frame.

Hypothesis 2: People provided with hedonic information will show a more positive attitude towards cargo bikes-sharing compared to people provided with no goal frame.

Values

Values are important predictors of the type of goals people pursue in certain situations (Lindenberg & Steg, 2007). Value Theory allows to categorize many different motivations for behaviour and has been shown repeatedly to be effective in environmental psychology research. Value Theory was first proposed by Schwartz (1992; 1994). Values are defined as transsituational principles in people's lives, guiding their behaviour and decisions. In Schwartz's Value Theory, sixteen different value orientations are proposed. In environmental psychology, special emphasis has been given to four values: egoistic, hedonic, altruistic and biospheric values (De Groot et al., 2016). People who strongly endorse egoistic values tend to

focus on financial and status related aspects of a situation. Those who strongly endorse hedonic values focus on pleasure and ease. Altruistic values guide people more towards social aspects of a situation, considering whether their behaviour corresponds to the norm. For people who strongly endorse biospheric values, environmental aspects are often most relevant in their behaviour and decision-making.

Considering that values are relatively stable across situations (Schwartz, 1992), it would be interesting to find out how to motivate those with hedonic values to engage in pro-environmental behaviour. According to Value Theory and Goal-Framing Theory, those who endorse certain values will tend to focus on aspects of a situation that align with their values. When those aspects are accentuated, this should line up with personal values and therefore influence attitude and behaviour more, compared to when personal values and the information presented do not align (Steg et al., 2014b). Following this reasoning from Value Theory and Goal-Framing Theory, we predict:

Hypothesis 3: People in the 'hedonic framing' condition will have a higher attitude towards cargo bike-sharing when they more highly endorse hedonic values.

Attitude and Intention

In several studies on bike-sharing attitude was found to be a significant predictor of intentions to use such a system (Ge et al., 2020; Li et al., 2021; Yu et al., 2018). We therefore expect goal framing to influence the attitude that people have towards cargo bike-sharing, which in turn influences the intention to participate in such systems. Thus, we predict:

Hypothesis 4: A more positive attitude towards cargo bike-sharing will be related to a higher intention to participate in a cargo bike-sharing system.

Method

Design

This study is a between-subjects experimental design exploring the effects of differing

goal frames on the attitude towards electric cargo bike-sharing systems and intention to use electric cargo bike-sharing systems in Groningen.

Participants and Procedure

A total of 125 participants took part in this study, of which 83[1] were included in the analysis[2] (51 females, 31 males, 1 non-binary/third gender). Roughly 73% of the participants were between the ages of 20 to 29 years old and 64% of the participants had at least a bachelor's degree. Furthermore, 43% of the participants either owned a car or had access to one. In addition, the location that was most represented in this study is Centrum, (36.1% of participants indicated to live here), and the least represented location was Ten Boer (1.2% of participants live here). A Chi-Square test showed that there were no significant differences in the distribution of gender (X^2 (4) = 4.36, p = .359), age (X^2 (10) = 13.45, p = 0.20), education (X^2 (10) = 8.36, p = .593), location (X^2 (14) = 10.52, p = .723), or car ownership (X^2 (4) = 5.09, p = .278) between the different experimental conditions.

At first, we approached potential participants in Groningen's city centre. We briefly explained our study to them and then handed them a flyer (see Appendix A, Figure A1) or we let them scan a QR code that led them to the corresponding survey, which allowed them to fill out the questionnaire at any given time. Participants were only considered if they were 16 years or older, and they had to be residents of the city of Groningen. In the process of collecting our data, the Netherlands went into a lockdown due to the development of the COVID-19 pandemic, which meant we had to change our sampling method to distributing it through online platforms. In our post, we briefly introduced our study, along with a flyer (see Appendix A, Figure A2). To ensure that participants were 16 years or older and lived in

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[1] We did a prospective power analysis using GPower, which showed us that we would need 155 participants to have a statistical power that's high enough (ES = .25 α = .05, power = .80).
[2] The participants who were excluded from the analysis either did not give consent, did not finish the survey, or did not answer the attention check correctly.

Groningen, we added these questions to the survey.

The survey was provided in Dutch and English. Only participants who indicated proficient knowledge of either language will be considered during the data analysis. Participants were not compensated for taking place in the study.

The questionnaire

Participants were first presented with general information about the study. We told them that we would ask them their opinion on cargo bike-sharing, as well as their general opinions and views. We communicated the estimated time of ten to fifteen minutes to fill out the survey. We emphasized that we did not expect them to know anything about cargo bike-sharing beforehand. Additionally, we told them that their responses would be completely anonymous, we told them about their rights as a participant and who to contact in case of questions or uncertainties. After consenting to participate in the study, participants were led to the first question.

Firstly, we asked the participants to indicate their gender, age category and education level. Then we asked the participants about their values, their attachment to Groningen and their ecological worldview. After these questions, participants were randomly assigned to one of the three scenarios on cargo bikes and cargo bike-sharing, which was either not framed, hedonically framed or biospherically framed. After the manipulation, we asked them about the main benefits of cargo bike-sharing that were presented in the text they had read before, to check whether they had paid attention. Then we measured participants' attitude towards cargo bike-sharing, and their intention to use such a cargo bike-sharing system. Subsequently, participants' perceived behaviour control was measured. Lastly, for exploratory purposes, we asked participants some general questions. We asked them about their experience with cargo bikes, whether they owned or had access to a car, and whether they would consider using

cargo bikes for some trips they would otherwise do by car.

After the questionnaire, we informed the participants on the goal of our study, we told them about the manipulation and which scenario they had been exposed to, and we thanked them for their participation.

Materials

Description of Stimulus Materials

Participants' goal-frames were manipulated by three differing scenarios: the biospheric scenario, the hedonic scenario, and the control scenario. Participants were randomly assigned to one of the scenarios, where they were introduced to cargo bikes and the concept of cargo bike-sharing systems. Each scenario was characterized by a specific goal frame based on the Goal-Framing Theory as proposed by Lindenberg and Steg (2007) all of which highlight different benefits of cargo-bike sharing systems (see Appendix B for the complete scenarios).

In all scenarios, cargo bikes and cargo bike-sharing were shortly explained in a neutral way and were simply presented as a way of transporting goods. To clarify what a cargo bike was we added a picture of a cargo bike. In the English version, we also presented the Dutch and German terms for cargo bike, which are *bakfiets* and *Lastenräder.* In the control scenario this was all the information that was presented.

In the hedonic scenario, after the general text about cargo bikes and cargo bike-sharing, we added information with the goal to activate the participants' hedonic goal frame. We described cargo bike-sharing as fun, sketching an image of going on a picnic with friends or family and using the cargo bike to transport food and drinks. We emphasized that the cargo bikes would be electric and therefore they would be pleasurable and efficient to use.

In the biospheric scenario, after presenting participants with the general text, we added information with the goal to activate participants' normative goal frame. We emphasized the positive impact cargo bike-sharing systems have on the environment, as they can help reduce

car use and thereby reduce CO2 emissions and pollution. We sketched an image of how, in the future, this could allow for more green spaces in the city.

Attitude

      To measure attitude towards cargo bike-sharing, we used a validated scale that measures attitude, developed by Fishbein and Ajzen (1975). We used four items to measure participants' attitude towards cargo bike-sharing, measured on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scale was found to be internally consistent (α= .885, M = 3.8, SD = .8).

Intention

      Intention towards cargo bike-sharing was measured by a validated scale developed by Fishman and colleagues (2020). We used one item, which asked participants how likely it was that they would use the cargo bike-sharing system. We added another (non-validated) item which asked whether they would recommend using the sharing system to friends or family. The items were measured on a 5-point Likert scale, ranging from 1 (*very unlikely*) to 5 (*very likely*). The two items were internally consistent (α= .771, M = 3.4, SD = 1.1).

Values

      Participants' values were measured using the 16-item value scale developed by Steg and colleagues (2014b). The items were measured on a 9-point scale (-1 *opposed to my principles,* 0 = *not important* to 6 = *very important* and 7 = *of supreme importance*). Out of the sixteen items, three items were meant to measure hedonic values (α= .830, M = 4.9, SD = 1.4).

Manipulation check

      After the manipulation, we asked participants to identify which main benefits of cargo bike-sharing were mentioned in the text they had read before, to check whether they had paid

attention to the text (X^2 (4) = 32.30, p < .001; see also Appendix C, Table C1).[3]

Individual hypotheses

Apart from the main model, every student had an individual variable that they incorporated into the main model. As these scales are not relevant for this thesis, they will only be explained shortly. To measure place attachment, participants were asked to rate their emotional sentiments towards Groningen, using a scale developed by Halpenny (2010). Participants' ecological worldview was measured with the New Ecological Paradigm scale (NEP; Anderson, 2012). Finally, participants' perceived behaviour control was measured by a validated scale of Ajzen (2002).

Statistical Analysis

To process the data and to perform the statistical analyses, we used IBM SPSS Statistics, version 28.0.0.0 (190).

To ensure that the analysis can be executed, we checked whether the assumptions for an ANOVA analysis were met. Firstly, our research design included random and independent samples, allowing for independence of measures. Next, a Shapiro-Wilk test was run to test the assumption of normality. Results showed a significant p-value at an alpha level of .01 for the dependent variable attitude, meaning the distribution in this group significantly differs from a normal distribution. As the assumption of normality is not met, we perform a non-parametric alternative to the one-way ANOVA, namely the Kruskal-Wallis test. The Kruskal-Wallis test additionally assumes a similar distribution shape of the dependent variable for all groups. Test results showed this was the case. Therefore, we can proceed doing the Kruskal-Wallis test to test the first and second hypothesis.

To test the third hypothesis, proposing that those in the hedonic group will have a

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[3] We decided not to exclude those who did not answer the manipulation check correctly, but to merely use it to check whether participants had paid attention to the text.

more positive attitude towards cargo bike-sharing when they more highly endorse hedonic values, a linear regression analysis was performed. We only looked at those in the hedonic group (n = 30) and performed a linear regression testing the effect of hedonic values on attitude towards cargo bike-sharing. Linear regression assumes independent variables, linearity, homoscedasticity, and normality. As established before, we meet the assumption of independence of measures. Moreover, results of the Shapiro-Wilk test showed us that attitude was not normally distributed for all conditions. From the scatterplot of residuals, it appeared that the assumption of linearity and the assumption of homoscedasticity were not met. Therefore, the results of the linear regression analysis should be interpreted with caution.

To test the fourth hypothesis, proposing there is a positive relationship between attitude and intention, a correlation analysis was run between the two variables. As the assumption for normality was not met, we looked at the non-parametric Spearman's correlation. Attitude and intention were both measured on interval scales, hence they would be suitable for a Spearman's correlation test. Additionally, Spearman's correlation assumes paired observations, which applied to our data as all participants included in the data answered the questions for both scales. Finally, Spearman's correlation assumes a monotonic relationship between the two variables. We plotted the attitude and intention against each other on a scatter plot, which showed there is indeed a monotonic relationship between the two variables.

Results

We analysed the difference in attitude towards cargo bike-sharing between the three groups that were either presented with biospheric, hedonic or neutral information about cargo bike-sharing by performing a Kruskal-Wallis test.

Our first hypothesis proposes that participants who were presented with biospheric information on cargo bike-sharing will have a more positive attitude towards cargo bike-

sharing compared to those who were presented with hedonic information. Results of the Kruskal-Wallis test showed that there was no significant difference between the groups (X^2 (2) = .09, p = .957). The null-hypothesis of the test, proposing that there is no difference between the groups, can therefore not be rejected. Hence, our first hypothesis cannot be confirmed. Based on our data we cannot assume that presenting people with biospheric information about cargo bike-sharing will lead them to form a more positive attitude towards cargo-bike sharing, compared to those who were presented with hedonic information or those presented with merely neutral information.

Our second hypothesis proposes that participants who are presented with the hedonic information on cargo bike-sharing will have a more positive attitude towards cargo bike-sharing compared to those who were merely presented with neutral information. As results of the Kruskal-Wallis test showed that there was no significant difference between the groups, our second hypothesis cannot be confirmed. There is no reason to assume that presenting people with hedonic information will get them to form a more positive attitude towards cargo bike-sharing, compared to when they are only presented with neutral information.

The third hypothesis proposes that those people who were presented with the hedonic information will have a more positive attitude towards cargo bike-sharing when they more highly endorse hedonic values. To test this hypothesis, a linear regression was performed within the hedonic group, testing the effect of hedonic values on attitude towards cargo bike-sharing. These variables accounted for an insignificant amount of variance in attitude, R^2 = .00, F (1, 81) = 0.027, p = .869. This means that hedonic values do not have a significant impact on attitude towards cargo bike-sharing within the hedonic group. We cannot confirm the hypothesis that those presented with hedonic information have a higher attitude towards cargo bike-sharing when they more highly endorse hedonic values.

The fourth hypothesis proposes that people's attitude towards cargo bike-sharing will

be positively related to their intention towards cargo bike-sharing. To test this hypothesis, a Spearman correlation coefficient was computed to assess the relationship between attitude and intention. We found a significant positive correlation between the two variables, r (81) = .58, $p < .001$ (see Appendix C, Figure C1). Therefore, our fourth hypothesis, proposing that people's attitude towards cargo bike-sharing and their intention to use a cargo bike-sharing system are positively related, can be confirmed.

Exploratory Analysis

For our main analyses we decided not to exclude those who answered the manipulation check incorrectly. However, it might be interesting to gain insight into whether results would be significant if those cases are excluded. Note that our manipulation check was rather an attention check to see whether participants paid attention to the text they had read before, instead of a check whether the manipulation activated the goal frame.

I excluded those cases who answered the manipulation check incorrectly, resulting in a sample size of 51 participants. Results of the Kruskal-Wallis test again showed an insignificant difference between the three groups (X^2 (2) = .30, $p = .859$). Therefore, even when excluding those participants who seemingly did not pay attention to the text, the three groups do not significantly differ from each other.

Discussion

Does someone's goal-frame influence their attitude towards cargo-bike sharing systems? Our research shows no difference in attitude between the differently framed groups. Therefore, we cannot say that goal-frames influence the attitude that people have towards cargo bike-sharing. Furthermore, whether someone endorses hedonic values does not seem to impact the relationship between goal-framing and attitude towards cargo bike-sharing. Lastly, our results show that attitude towards cargo bike-sharing and intention to use cargo bike-

sharing systems are positively related to each other.

Our results are – for the most part – not in line with previous literature. Goal-Framing Theory proposes that pro-environmental behaviour is dependent on the goal-frame that is active (Lindenberg & Steg, 2007). People whose normative goal-frame is focal are usually more likely to engage in pro-environmental behaviour. Therefore, we expected that manipulating one's normative goal-frame by presenting them with biospheric information would result in a more positive attitude towards cargo bike-sharing. Nonetheless, our results do not show a higher attitude for those who were presented with biospheric information. Moreover, we expected that presenting people with hedonic information would result in the second highest score on attitude towards cargo bike-sharing. People whose hedonic goal-frame is focal are usually less likely to engage in pro-environmental behaviour (Lindenberg & Steg, 2007). However, when pro-environmental behaviour is seen as pleasurable and fun, people are more likely to engage in such behaviours (De Groot & Steg, 2010). Results do not show a higher attitude for those in the hedonic condition compared to the control condition, therefore not supporting previous literature on hedonic goal-frames. Additionally, our results do not align with previous literature on values and Value Theory. When someone endorses certain values, goals that relate to these values tend to be stronger in different situations (Steg et al., 2014b). Therefore, I expected that those presented with hedonic information would have a higher attitude towards cargo bike-sharing when they more highly endorsed hedonic values. Our results do not show a significant effect, thereby it does not support previous research on values.

Our research is supportive of previous literature on the relationship between attitude and intention (Ge et al., 2020; Li et al., 2021; Yu et al., 2018), showing how attitude towards

certain behaviour and intention to engage in this behaviour are positively related.

Limitations and Implications for Future Research

There are a few limitations to our research that might have influenced the results. First, our research took place during the COVID-19 pandemic, which impacted our sampling method. During the process of collecting data, the Netherlands went into a lockdown. This meant we had to switch to collecting data online instead of randomly approaching people in the streets, which resulted in a convenience sample. Most of our participants are aged between 20 and 29 (73%), which means our sample is not quite representative for the city of Groningen – something we aimed for in the first place. From several studies on bike-sharing it appears that (potential) users are often relatively young (Ge et al., 2020; LDA Consulting, 2013; Fishman et al., 2014)**.** In our research, the overall attitude towards cargo bike-sharing is relatively high, which could be explained by the young age of participants. Therefore, our sample could deviate from a representative sample.

Moreover, the results of the prospective power analysis showed that we needed 155 participants – we had 83. As our sample size is smaller, this decreases the power of our test and increases the chance we did not find an effect even though there might be one. Therefore, the probability to detect a possible effect would have been higher if we had recruited at least 155 participants. Additionally, the small sample size impacts the interpretation for the results of the linear regression. As only the hedonic group was included - resulting in a sample size of 30 - the power of the test is relatively low and there is a higher probability that we did not find an effect while there was one.

Subsequently, we aimed to include a manipulation check. Unfortunately, our manipulation check does not check whether the manipulation worked, but rather checks whether participants paid attention to the text that was presented to them. In the exploratory results we found that the effect of goal-framing on attitude is still insignificant when only

considering those who answered the "manipulation check" correctly. This would suggest that lack of attention did not affect our results. However, due to a low sample size and therefore less power to detect an effect, we cannot draw serious conclusions from this analysis. Lack of attention could still have influenced the results.

Additionally, it is possible that our manipulation was not effective, and we failed to manipulate the participants' goal-frames. Which goal is focal depends on the values someone endorses, as well as situational cues (Steg et al., 2014a; Steg et al., 2014b). We can draw one's focus towards certain situational cues, but it is harder to change the values they endorse. As values are strong predictors of goals, it could be possible that one's values are more predictive of their attitude towards cargo bike-sharing and even though certain information was presented to them, a goal-frame aligning with their values remained focal. Future research might benefit from studying the effect that values have on attitude towards cargo bike-sharing and the intention to use such systems.

A different explanation for our results differing from Goal-Framing Theory is that the theory is not applicable to cargo bike-sharing, and there are different variables that play a larger role when it comes to this specific type of behaviour. In multiple studies, bike-sharing is studied from a technological point of view, rather than a pro-environmental point of view (Yu et al., 2018; Gao et al., 2019; Zhanyou et al., 2020; Lyu & Zhang, 2021). These studies often show a significant impact of perceived usefulness and perceived ease of use on attitude towards bike-sharing systems and the intention to use such systems. Perhaps, viewing cargo bike-sharing as a new form of technology rather than just pro-environmental behaviour can give more clarity into people's attitude and intention towards (using) cargo bike-sharing. In future research on cargo bike-sharing, studying cargo bike-sharing through a different theoretical framework, such as the Technology Acceptance Model, might lead to valuable

insights.

Conclusion

We tried to explain people's attitude towards cargo bike-sharing systems and intention to use such systems using Goal-Framing Theory. Our research did not show an effect of goal-framing on attitude towards cargo bike-sharing. Insignificant results might be due to an insufficient sample size, a convenience sample, a failed manipulation, or perhaps Goal-Framing Theory is less suitable for this specific type of behaviour. Supportive of previous literature, we found a significant relationship between attitude towards cargo bike-sharing and the intention to engage in such systems. Our results did not show a more positive attitude towards cargo bike-sharing when people in the hedonic group had higher hedonic values. Due to an insufficient sample size, no serious conclusions can be drawn from this outcome. Further research on psychological aspects of cargo bike-sharing will be necessary to understand motivations to engage in cargo bike-sharing systems. Gaining more insight in motivations for (potential) users to engage in cargo bike-sharing systems can in turn support a more effective promotion of such systems.

References

Agyeman, J., McLaren, D., Schaefer-Borrego, A. (2013). Sharing cities. *Friends of the earth*.

   Retrieved from:

   http://media.ontheplatform.org.uk/sites/default/files/agyeman_sharing_cities.pdf

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory

   of planned behavior. *Journal of Applied Social Psychology, 32(4),* 665-683.

Anderson, M. (2012). New Ecological Paradigm (NEP) Scale. *Berkshire Encyclopedia of*

   Sustainability, 6, 260-262

Bardhi, F., Eckhardt, G.M. (2012). Access-Based Consumption: The Case of Car Sharing.

   Journal of Consumer Research, 39(4), 881–898. https://doi.org/10.1086/666376

Becker, S., Rudolf, C. (2018). Exploring the Potential of Free Cargo-Bikesharing for

   Sustainable Mobility. *Gaia-Ecological Perspectives for Science and Society, 27*(1),

   156-164. https://doi.org/10.14512/gaia.27.1.11

Bocker, L., Meelen, T. (2016). Sharing for people, planet or profit? Analysing motivations for

   Intended sharing economy participation. *Environmental Innovation and Societal*

   Transitions, 23, 28-39. https://doi.org/10.1016/j.eist,2016.09,004

Cohen, B., & Kietzmann, J. (2014). Ride on! Mobility business models for the sharing

   economy. *Organization & Environment*, *27*, 279–296.

   https://doi.org/10.1177/1086026614546199

De Groot, J.M., Steg, L. (2010). Relationships between value orientations, self-determined

   motivational types and pro-environmental behavioural intentions. *Journal of*

   Environmental Psychology 30(4), 368-378.

   https://doi.org/10.1016/j.jenvp.2010.04.002

De Groot, J., Thøgersen, J., and Schubert, I. (2016). Morality and green consumer behaviour:

   a psychological perspective. *Ethics and Morality in Consumption.* 57–74.

https://doi.org/10.4324/9781315764320

Fishbein, M.A., Ajzen, I. (1975). Measurement Techniques. *Belief, Intention and Behavior: An Introduction to Theory and Research.* Addison-Wesley, Reading, Massachusetts.

Fishman, E., Washington, S., & Haworth, N. (2013). Bike share: A synthesis of the literature. *Transport Reviews, 33*(2), 148–165. https://doi.org/10.1080/01441647.2013.775612

Fishman, E., Washington, S., Haworth, N., & Mazzei, A. (2014). Barriers to bikesharing: An analysis from Melbourne and Brisbane. *Journal of Transport Geography, 41*, 325–337. https://doi.org/10.1016/j.jtrangeo.2014.08.005

Fishman, J., Lushin, V. & Mandell, D.S. (2020). Predicting implementation: comparing validated measures of intention and assessing the role of motivation when designing behavioral interventions. *Implement Sci Commun*(1), 81. https://doi.org/10.1186/s43058-020-00050-4

Gao, S., Ying, L., Guo, H. (2019). Understanding the adoption of bike sharing systems: By combining technology diffusion theories and perceived risk. *Journal of Hospitality and Tourism Technology, 10*(3), 494 – 508. https://doi.org/10.1108/JHTT-08-2018-0089

Ge, Y., Qu, W., Qi, H., Cui, X., Sun, X. (2020). Why people like using bikesharing: Factors influencing bikeshare use in a Chinese sample. *Transportation research part D: transport and Environment, 87,* https://doi.org/10.1016/j.trd.2020.102520

Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. *Journal of Environmental Psychology, 30*(4), 409–421. https://doi.org/10.1016/j.jenvp.2010.04.006

Hamari, J., Sjöklint, M., Ukkonen, A. (2016) The sharing economy: Why people participate in collaborative consumption. *A Journal of the Association for Information Science*

and Technology 67(9), 2047-2059 https://doi.org/10.1002/asi.23552

Hess, A.K., Schubert, I. (2019). Functional perceptions, barriers, and demographics concerning e-cargo bike sharing in Switzerland. *Transportation Research Part D-Transport and Environment, 27*, 153-168. doi: 10.1016/j.trd.2018.12.013

IPCC. (2014). Climate Change 2014 Synthesis Report Summary for Policymakers. *The Intergovernmental Panel on Climate Change*: Author.

LDA Consulting. (2013). 2013 Capital bikeshare member survey report. Washington, DC: Commissioned by Capital Bikeshare. Retrieved from http://capitalbikeshare.com/assets/pdf/CABI-2013SurveReport.pdf

Li, J., Shen, J., Bicen, B. (2021). Exploring Intention to Use Shared Bicycles by the Extended Theory of Planned Behavior. *Sustainability, 13.* https://doi.org/10.3390/su13084137

Lindenberg, S., Steg L. (2007). Normative, Gain and Hedonic Goal Frames Guiding Environmental Behavior. *Journal of Social Issues, 63*(1), 117-137. https://doi.org/10.1111/j.1540-4560.2007.00499.x

Litman, T. (2017). Travel Demand Management Encyclyepdia. Retrieved from http://www.vtpi.org/tdm/tdm67.htm

Lyu, J., Zhang, J. (2021). An Empirical Study into Consumer Acceptance of Dockless Bikes Sharing System Based on TAM. *Sustainability, 13*(4), 1831. https://doi.org/10.3390/su13041831

Ogilvie, D., & Goodman, A. (2012). Inequities in usage of a public bicycle sharing scheme: Socio-demographic predictors of uptake and usage of the London (UK) cycle hire scheme. *Preventive Medicine, 55*(1), 40–45. https://doi.org/10.1016/j.ypmed.2012.05.002

Schwartz, S. H. (1992). Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. *Advances in Experimental Social*

Psychology, 25, 1-65. https://doi.org/10.1016/S0065-2601(08)60281-6

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues, 50*, 19-45. https://doi.org/10.1111/j.1540-4560.1994.tb01196.x

Steg, L. and De Groot, J.I.M. (2012). Environmental values. *The Oxford Handbook of Environmental and Conservation Psychology*, 81–92. https://doi.org/10.1093/oxfordhb/9780199733026.013.0005

Steg, L., Bolderdijk, J.W., Keizer, K.E., and Perlaviciute, G. (2014a). An integrated framework for encouraging pro-environmental behaviour: the role of values, situational factors and goals. *Journal of Environmental Psychology* 38: 104–115. https://doi.org/10.1016/j.jenvp.2014.01.002

Steg, L., Perlaviciute, G., Van der Werff, E., and Lurvink, J. (2014b). The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. *Environment and Behavior* 46 (2): 163–192. https://doi.org/10.1177/0013916512454730

Tussyadiah, I.P. (2016). Factors of satisfaction and intention to use peer-to-peer accommodation. *International Journal of Hospitality Management, 55*, 70-80. https://doi.org/10.1016/j.ijhm.2016.03.005

Yu, Y., Yi, W., Feng, Y., Liu, J. (2018). Understanding the Intention to Use Commercial Bike-sharing Systems: An Integration of TAM and TPB. https://doi.org/10.24251/hicss.2018.082

Zhanyou, W., Dongmei, H., & Yaopei, Z. (2020). How to improve users' intentions to continued usage of shared bicycles: A mixed method approach. *PLoS ONE, 15*(2). https://doi.org/10.1371/journal.pone.0229458

Appendix A

Figure A1

The flyers handed out to potential participants

Figure A2

The flyer distributed through online platforms

Appendix B

The Scenarios

Control Scenario

Have you ever heard of cargo bikes (bakfietsen/Lastenräder) before? A cargo bike has an area big enough to fit and transport large goods. This cargo area, often in the form of a box or flat platform, can be located in the front or back of the bike. Cargo bikes are used for various purposes such as transporting furniture, groceries, or even children. The municipality of Groningen is considering introducing a cargo bike-sharing system for electric cargo bikes with various docking stations located at hotspots throughout the city. At said stations, electric cargo bikes will be available to the locals, while those not in use will remain there to charge.

Hedonic Scenario

Have you ever heard of cargo bikes (bakfietsen/Lastenräder) before? A cargo bike has an area big enough to fit and transport large goods. This cargo area, often in the form of a box or flat platform, can be located in the front or back of the bike. Cargo bikes are used for various purposes such as transporting furniture, groceries, or even children. The municipality of Groningen is considering introducing a cargo bike-sharing system for electric cargo bikes with various docking stations located at hotspots throughout the city. At said stations, electric cargo bikes will be available to the locals, while those not in use will remain there to charge. In addition, using a cargo bike can be fun: you get to spend time outside with friends and family while comfortably taking various goods along with you, such as food and drinks for a picnic. Cargo bike-sharing systems present a convenient and flexible type of transport, as you do not need to look for a parking spot for your car in the usually busy city center. Also, electronic cargo bikes allow for comfortable and time-efficient trips.

Biospheric Scenario

Have you ever heard of cargo bikes (bakfietsen/Lastenräder) before? A cargo bike has

an area big enough to fit and transport large goods. This cargo area, often in the form of a box or flat platform, can be located in the front or back of the bike. Cargo bikes are used for various purposes such as transporting furniture, groceries, or even children. The municipality of Groningen is considering introducing a cargo bike-sharing system for electric cargo bikes with various docking stations located at hotspots throughout the city. At said stations, electric cargo bikes will be available to the locals, while those not in use will remain there to charge. In addition, using a cargo bike is a more sustainable way of transportation: Cargo bike-sharing systems help decrease car use and traffic congestion and thereby help reduce CO_2 emissions and air-, and noise pollution. A possible decrease in car use through these sharing systems allows for more green spaces and biodiversity in the future. Thus, using such systems can actively contribute to environmental preservation and restoration.

Appendix C

Table C1

Manipulation Check

	No frame	Hedonic frame	Biospheric frame
Transporting goods	13	7	3
Fun, convenience, time-efficiency and transporting goods	7	16	2
Reducing CO2 emissions, environmental preservation and transporting goods	6	7	22
Total	26	30	27

Figure C1

Scatterplot Depicting the Correlation between Attitude and Intention towards (using) cargo

bike-sharing systems