

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Effects of new dock-less bicycle-sharing programs on cycling: a retrospective study in Shanghai
<b>AUTHORS</b>	Jia, Yingnan; Ding, Ding; Gebel, Klaus; Chen, Lili; Zhang, Sen; Ma, Zhicong; Fu, Hua

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Jian-Qiang Wang Central South University, China
<b>REVIEW RETURNED</b>	06-Jun-2018

<b>GENERAL COMMENTS</b>	<p>This study through recruiting 1265 participants for a retrospective study in May 2017, and finding some meaning conclusions. The study of this paper is interesting and innovative to some degree. But some concerns arise when reading the document.</p> <ol style="list-style-type: none"> <li>1. It is too complex of the results that is presented in Abstract section, it is better only present the main finding of this study.</li> <li>2. The research gap of this study is not clear, it is better for authors to recognize the Introduction section, and present the research gap more accurate.</li> <li>3. The authors use Table 1 to report the demographic characteristics of the study sample, and it is better to show it with the chart simultaneous.</li> <li>4. The predictors of adopting cycling presented in Table 2 related to Models 1, 2, and 3, please distinguish them clearly. Maybe it is better for the authors use the chart to show the results simultaneous.</li> <li>5. What is the novelty of this study compare with previous studies? The authors should recognize it in Discussion section.</li> <li>6. The Conclusion section present in this study is too simple, it is better to descript it more detailed.</li> <li>7. Some papers strongly related to bicycle-sharing are missing. Some examples: <ul style="list-style-type: none"> <li>-- A multi-phase QFD-based hybrid fuzzy MCDM approach for performance evaluation: A case of smart bike-sharing programs in Changsha, Journal of Cleaner Production, 171:1068-1083,2018</li> <li>-- An integrated approach for failure mode and effects analysis based on fuzzy best-worst, relative entropy, and VIKOR methods, Applied Soft Computing, DOI: 10.1016/j.asoc.2018.03.037,2018</li> </ul> </li> </ol>
-------------------------	--

	In my opinion, this manuscript is interesting and valuable, but there are some parts are not clear description in the manuscript, so it should be accepted when a major modifications.
--	--

<b>REVIEWER</b>	Susan Shaheen UC Berkeley, USA
<b>REVIEW RETURNED</b>	15-Jul-2018

<b>GENERAL COMMENTS</b>	<p>This paper examines the effects of innovative bike sharing programs in Shanghai. In general, the literature review is inadequate to merit publication. There is a fairly extensive body of literature that discusses the role of public policy, supportive infrastructure, and the role of the built environment on bikesharing use and its associated impacts. For example, one of these studies discussed the role of transit accessibility on the bikesharing use. The authors are encouraged to review and consider the following resources for their literature review, where applicable.</p> <p>Borecki, Natalie, Darren Buck, Payton Chung, Patricia Happ, Nicholas Kushner, Tim Maher, Bradley Rawls, Paola Reyes, Matthew Steenhoek, Casey Studhalter, Austin Watkins, and Ralph Buehler. 2012. Virginia Tech Capital Bikeshare Study. Available at <a href="https://ralphbu.files.wordpress.com/2012/01/vt-bike-share-study-final3.pdf">https://ralphbu.files.wordpress.com/2012/01/vt-bike-share-study-final3.pdf</a>.</p> <p>Cohen, Adam and Susan Shaheen. 2016. Planning for Shared Mobility. American Planning Association. Available at: <a href="https://www.planning.org/publications/report/9107556/">https://www.planning.org/publications/report/9107556/</a></p> <p>Gleason, Rebecca, and Laurie Miskimins. 2012. Exploring Bicycle Options for Federal Lands: Bike Sharing, Rentals and Employee Fleets. Report Number FHWA-WFL/TD-12-001, Federal Highway Administration. Available at <a href="http://www.nps.gov/transportation/pdfs/FHWA_bicycle_options.pdf">www.nps.gov/transportation/pdfs/FHWA_bicycle_options.pdf</a>.</p> <p>Institute for Transportation and Development Policy. 2013. "Riding the Bike-Share Boom: The Top Five Components of A Successful System." Available at <a href="http://www.itdp.org/riding-the-bike-share-boom-the-top-five-components-of-a-successful-system/">www.itdp.org/riding-the-bike-share-boom-the-top-five-components-of-a-successful-system/</a>.</p> <p>Martin, Elliot, Adam Cohen, Jan Botha, and Susan Shaheen. 2016. Bikesharing and Bicycle Safety. San Jose, CA: Mineta Transportation Institute. Available at <a href="http://transweb.sjsu.edu/PDFs/research/1204-bikesharing-and-bicycle-safety.pdf">http://transweb.sjsu.edu/PDFs/research/1204-bikesharing-and-bicycle-safety.pdf</a>.</p> <p>Nair, Rahul, Elise Miller-Hooks, Robert Hampshire, and Ana Busic. 2013. "Large-Scale Vehicle Sharing Systems: An Analysis of Vélib." International Journal of Sustainable Transportation 7 (1): 85–106.</p> <p>Shaheen, Susan and Elliot Martin. (2015). Unraveling the Modal Impacts of Bikesharing. Access Magazine. Available at: <a href="https://www.accessmagazine.org/fall-2015/unraveling-the-modal-impacts-of-bikesharing/">https://www.accessmagazine.org/fall-2015/unraveling-the-modal-impacts-of-bikesharing/</a></p> <p>Shaheen, Susan, Elliot Martin, Nelson Chan, Adam Cohen, and Mike Pogodzinski. 2014. Public Bikesharing in North</p>
-------------------------	---

	<p>America During A Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts. Available at <a href="http://transweb.sjsu.edu/project/1131.html">http://transweb.sjsu.edu/project/1131.html</a>.</p> <p>Shaheen, Susan, Elliot Martin, and Adam Cohen. 2013. "Public Bikes and Modal Shift Behavior: A Comparative Study of Early Bikes in North America." <i>International Journal of Transportation</i> 1 (1): 35–54.</p> <p>NACTO Bikes Annual Report (2010-2017) Summary - Available at: <a href="https://nacto.org/bike-share-statistics-2017/">https://nacto.org/bike-share-statistics-2017/</a></p>
--	---

<b>REVIEWER</b>	Jay Maddock Texas A&M University, United States
<b>REVIEW RETURNED</b>	24-Aug-2018

<b>GENERAL COMMENTS</b>	<p>This paper reports on a retrospective sample of people living in Shanghai on their experiences with mobile bike share. The paper is well-written and of public health importance. In general, the study was conducted appropriately and recognizes the limitations of the design. There are a few minor areas where the paper could be improved:</p> <ol style="list-style-type: none"> <li>1. The use of the word "dockless" would be helpful in the title instead of mobile because all bikes are hopefully mobile.</li> <li>2. Pg 6, ln 9 – the subheading Patient and Public Involvement is confusing since there are no patients in this study</li> <li>3. Where were the intercept surveys collected? Was it near bikes, in a mall etc?</li> <li>4. What was the response rate?</li> </ol> <p>Minor comments</p> <p>Pg 4, ln 20 – The "n" is missing at the end of congestion. Pg 4, ln 33-40 – I am assuming this is primary mode of transportation but this is not clear. Table 1 there is a strange typo in the last category for age</p>
-------------------------	---

### VERSION 1 – AUTHOR RESPONSE

Reviewer Name

Jian-Qiang Wang

Institution and Country

Central South University, China

Please state any competing interests or state 'None declared':

None declared.

Please leave your comments for the authors below

This study through recruiting 1265 participants for a retrospective study in May 2017, and finding some meaning conclusions. The study of this paper is interesting and innovative to some degree. But some concerns arise when reading the document.

1. It is too complex of the results that is presented in Abstract section, it is better only present the main finding of this study.

**Response to Reviewer's comments:**

We appreciate your kind suggestions. Result section of abstract has been revised as follows: "The proportion of participants cycling for transport increased from 33.3% prior to the launch of the bicycle-sharing programs to 48.3% one year after the launch ( $p < 0.001$ ). Being in the age group of 30-49 years (OR=2.28; 95%CI: 1.30-4.00), living within the inner ring of the city (OR=2.27; 95%CI: 1.22-4.26), having dedicated bicycle lanes (OR=1.37, 95% CI 1.12-1.68) and perceiving riding shared bicycles as fashionable (OR=1.46, 95% CI 1.21-1.76) were positively associated with adopting cycling for transport. Access to a public transportation stop/station (OR=0.82, 95% CI 0.67-0.99) was inversely correlated with adopting cycling for transport."

2. The research gap of this study is not clear, it is better for authors to recognize the Introduction section, and present the research gap more accurate.

**Response to Reviewer's comments:**

Several sentences have been added in the introduction section where we more explicitly pointed out research gaps as follows:

- (1) Page 5, line 15-17: "Despite the rapid growth in dock-less bicycle sharing programs, there is very limited evidence on whether dock-less bicycle-sharing programs can change travel modes at the population level."
- (2) Page 5, line 22-24: "However, these socio-ecological correlates have rarely been examined in evaluations of PBSPs and remain important research gaps."

3. The authors use Table 1 to report the demographic characteristics of the study sample, and it is better to show it with the chart simultaneous.

**Response to Reviewer's comments:**

We appreciate your kind suggestions. However, we think that using charts will substantially increase the space required to display all the information, therefore I prefer to keep our current Table 1.

4. The predictors of adopting cycling presented in Table 2 related to Models 1, 2, and 3, please distinguish them clearly. Maybe it is better for the authors use the chart to show the results simultaneous.

**Response to Reviewer's comments:**

We thank the reviewer for this suggestion. We have now added three footnotes to Table 2 to explain exactly which variables are adjusted for.

5. What is the novelty of this study compare with previous studies? The authors should recognize it in Discussion section.

**Response to Reviewer's comments:**

We appreciate your kind suggestions. Generally, this is the first community-based study to evaluate the effect of new dock-less mobile PBSPs on cycling for transport. Furthermore, there are few studies which focused on the potential correlates of adopting commuting cycling, especially in the context of the new PBSPs. However, with the rapid development and popularity of dockless bicycle sharing programs, it is necessary to clarify the potential correlates of adopting commuting cycling. The discussion section has been extensively structured to highlight the innovative aspects of this study.

6. The Conclusion section present in this study is too simple, it is better to descript it more detailed.

**Response to Reviewer's comments:**

We appreciate your kind suggestions. Several sentences have been added as follows: "The rapid development and popularity of dock-less PBSPs provides new opportunities for active travel, but also poses challenges for their management. Operators of dock-less PBSPs and local governments should work together to create better built environment and social norms for promoting active travel and physical activity."

7. Some papers strongly related to bicycle-sharing are missing. Some examples:

-- A multi-phase QFD-based hybrid fuzzy MCDM approach for performance evaluation: A case of smart bike-sharing programs in Changsha, Journal of Cleaner Production, 171:1068-1083,2018

-- An integrated approach for failure mode and effects analysis based on fuzzy best-worst, relative entropy, and VIKOR methods, Applied Soft Computing, DOI: 10.1016/j.asoc.2018.03.037,2018

**Response to Reviewer's comments:**

We appreciate your kind suggestions. These two papers have been cited in the discussion section as follows: "Firstly, public bikesharing operators and local governments should consider what types of systems are the most effective for linking bikesharing with public transit and vehicle-sharing systems according to population density and land use.<sup>35,39,61</sup> Secondly, local governments should assess the social and environmental impacts of new bikesharing programs.<sup>61</sup> Besides quantitative assessment, some in-depth qualitative evaluations should be encouraged.<sup>62,63</sup>"

8. In my opinion, this manuscript is interesting and valuable, but there are some parts are not clear description in the manuscript, so it should be accepted when a major modifications.

**Response to Reviewer's comments:**

We appreciate your encouraging feedback. The manuscript has been revised according to your suggestions.

Reviewer Name

Susan Shaheen

Institution and Country

UC Berkeley, USA

Please state any competing interests or state 'None declared':

None

Please leave your comments for the authors below

1. This paper examines the effects of innovative bike sharing programs in Shanghai. In general, the literature review is inadequate to merit publication. There is a fairly extensive body of literature that discusses the role of public policy, supportive infrastructure, and the role of the built environment on bikesharing use and its associated impacts. For example, one of these studies discussed the role of transit accessibility on the bikesharing use. The authors are encouraged to review and consider the following resources for their literature review, where applicable.

**Response to Reviewer's comments:**

We appreciate your kind suggestions. We have extensively read the recommended literature and cited them in the Discussion. We discussed the citation of each paper as follows.

Borecki, Natalie, Darren Buck, Payton Chung, Patricia Happ, Nicholas Kushner, Tim Maher, Bradley Rawls, Paola Reyes, Matthew Steenhoek, Casey Studhalter, Austin Watkins, and Ralph Buehler. 2012. Virginia Tech Capital Bikeshare Study. Available at <https://ralphbu.files.wordpress.com/2012/01/vt-bike-share-study-final3.pdf>.

The paper has been cited as follows: "Firstly, enough bicycles per resident (more than 50 bicycles per 1,000 resident in Shanghai) and the GPS positioning function allow for better access to bicycles.<sup>38-40</sup> Secondly, conventional PBSPs in China require local "HuKou" (a permanent residency system unique to China) and are therefore not available to visitors and temporary residents. Instead, dock-less PBSPs are available to all who have registered an account online.<sup>38</sup> Thirdly, a fully dock-less system makes it convenient for users to pick up and drop off bicycles wherever they want. Fourthly, the provided bicycles are durable, attractive and practical.<sup>38,40</sup>"

Cohen, Adam and Susan Shaheen. 2016. Planning for Shared Mobility. American Planning Association. Available at: <https://www.planning.org/publications/report/9107556/>

The paper has been cited as follows:" Thirdly, companies that run dock-less bike share programs should be open to sharing more data about bike usage with local governments to facilitate evaluations, so that the local governments can better support the development of bikesharing programs to help achieve goals of safety, equity, and sustainable mobility.<sup>44,64</sup>"

Gleason, Rebecca, and Laurie Miskimins. 2012. Exploring Bicycle Options for Federal Lands: Bike Sharing, Rentals and

Employee Fleets. Report Number FHWA-WFL/TD-12-001, Federal Highway Administration. Available at [www.nps.gov](http://www.nps.gov)

[/transportation/pdfs/FHWA\\_bicycle\\_options.pdf](/transportation/pdfs/FHWA_bicycle_options.pdf).

The paper has been cited as follows:" Firstly, it is difficult to control the distribution of dock-less shared bicycles, resulting in insufficient bicycles in some areas and overcrowding in others.<sup>45</sup>"

Institute for Transportation and Development Policy. 2013. "Riding the Bike-Share Boom: The Top Five Components

of A Successful System." Available at [www.itdp.org/riding-the-bike-share-boom-the-top-five-components-of-a](http://www.itdp.org/riding-the-bike-share-boom-the-top-five-components-of-a)

-successful-system/.

The paper has been cited as follows.

- (1) " Firstly, enough bicycles per resident (more than 50 bicycles per 1,000 resident in Shanghai) and the GPS positioning function allow for better access to bicycles.<sup>38-40</sup>"
- (2) "Fourthly, the provided bicycles are durable, attractive and practical.<sup>38,40</sup>"

Martin, Elliot, Adam Cohen, Jan Botha, and Susan Shaheen. 2016. *Bikesharing and Bicycle Safety*. San Jose, CA: Mineta

Transportation Institute. Available at <http://transweb.sjsu.edu/PDFs/research/1204-bikesharing-and-bicycle-safety.pdf>.

The paper has been cited as follows:" Several related issues have been raised: such as road and pedestrian safety concerns, bicycle dumping, crowding footpath and vandalism.<sup>21,60</sup>"

Nair, Rahul, Elise Miller-Hooks, Robert Hampshire, and Ana Busic. 2013. "Large-Scale Vehicle Sharing Systems: An Analysis of Vélib." *International Journal of Sustainable Transportation* 7 (1): 85–106.

The paper has been cited as follows:" Firstly, enough bicycles per resident (more than 50 bicycles per 1,000 resident in Shanghai) and the GPS positioning function allow for better access to bicycles.<sup>38-40</sup>"

Shaheen, Susan and Elliot Martin. (2015). *Unraveling the Modal Impacts of Bikesharing*. Access Magazine. Available at: <https://www.accessmagazine.org/fall-2015/unraveling-the-modal-impacts-of-bikesharing/>

The paper has been cited as follows:" Another study on members of bikesharing programs revealed that in Montreal, Toronto, Washington, DC, Minneapolis-Saint Paul, 40% of members reduced their number of car trips while only 0.4% of members increased their car trips.<sup>34,35</sup>"

Shaheen, Susan, Elliot Martin, Nelson Chan, Adam Cohen, and Mike Pogodzinski. 2014. *Public Bikesharing in North*

America During A Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts.

Available at <http://transweb.sjsu.edu/project/1131.html>.

The paper has been cited as follows:” Firstly, public bikesharing operators and local governments should consider what types of systems are the most effective for linking bikesharing with public transit and vehicle-sharing systems according to population density and land use.<sup>35,39,61</sup> Secondly, local governments should assess the social and environmental impacts of new bikesharing programs.<sup>61</sup>”

Shaheen, Susan, Elliot Martin, and Adam Cohen. 2013. “Public Bikesharing and Modal Shift Behavior: A Comparative

Study of Early Bikesharing Systems in North America.” *International Journal of Transportation* 1 (1): 35–54.

The paper has been cited as follows: ”Firstly, public bikesharing operators and local governments should consider what types of systems are the most effective for linking bikesharing with public transit and vehicle-sharing systems according to population density and land use.<sup>35,39,61</sup>”

NACTO Bikesharing Annual Report (2010-2017) Summary - Available at: <https://nacto.org/bike-share-statistics-2017/>

The paper has been cited as follows.

- (1) ” However, dock-less PBSPs are not guaranteed to be more effective than conventional PBSPs in all settings. A report on bike share in the U.S. in 2017 showed that station-based systems produced an average of 1.7 rides per bike per day, while dock-less bike share systems nationally had an average of about 0.3 rides per bike per day.<sup>44</sup>”
- (2) “Secondly, nearly one-third of station-based bicycle share systems have income-based discount programs, making renting station-based bicycles cheaper and potentially more appealing for low-income groups.<sup>44</sup> Thirdly, station-based and dock-less BSPSs may appeal to different types of riders. Some evidence from U.S. suggests that station-based bicycle share trips are mainly for commuting, while dock-less bicycle share trips suggested more recreational use.<sup>44</sup>”
- (3) “Thirdly, companies that run dock-less bike share programs should be open to sharing more data about bike usage with local governments to facilitate evaluations, so that the local governments can better support the development of bikesharing programs to help achieve goals of safety, equity, and sustainable mobility.<sup>44,64</sup>”

Reviewer Name

Jay Maddock

Institution and Country

Texas A&M University, United States

Please state any competing interests or state 'None declared':

None declared

Please leave your comments for the authors below

This paper reports on a retrospective sample of people living in Shanghai on their experiences with mobile bike share. The paper is well-written and of public health importance. In general, the study was conducted appropriately and recognizes the limitations of the design. There are a few minor areas where the paper could be improved:

1. The use of the word “dockless” would be helpful in the title instead of mobile because all bikes are hopefully mobile.

**Response to Reviewer’s comments:**

We appreciate your kind suggestions. “Mobile” has been replaced by “dock-less”.

2. Pg 6, ln 9 – the subheading Patient and Public Involvement is confusing since there are no patients in this study

**Response to Reviewer’s comments:**

We appreciate your kind suggestions. However, *BMJ OPEN* has implemented an additional requirement to all articles to include 'Patient and Public Involvement' statement within the main text.

3. Where were the intercept surveys collected? Was it near bikes, in a mall etc?

**Response to Reviewer’s comments:**

We appreciate your kind suggestions. We set up several intercept survey sites inside each selected neighborhood instead of the entrance. Trained interviewers conducted intercept survey around each survey site.

4. What was the response rate?

**Response to Reviewer’s comments:**

We appreciate your kind suggestions. Only a few residents refused to accept investigation. However, unfortunately, we did not record the specific count. We will pay attention to collecting relevant information in future research.

Minor comments

5. Pg 4, ln 20 – The “n” is missing at the end of congestion.

**Response to Reviewer’s comments:**

We appreciate your kind suggestions. We are very sorry for the mistake. It has been corrected.

6. Pg 4, ln 33-40 – I am assuming this is primary mode of transportation but this is not clear.

**Response to Reviewer’s comments:**

We appreciate your kind suggestions. The sentence has been revised as follows: “With the economic development and booming car industry, between 2002 and 2010-2012, the proportion of people using motorized transport as the main mode of transportation increased from 33.5% to 61.9%, while the proportion traveling by bicycle and walking decreased from 35.8% and 30.7% to 15.6% and 22.5%, respectively.<sup>14</sup>”

7. Table 1 there is a strange typo in the last category for age

**Response to Reviewer’s comments:**

We appreciate your kind suggestions. We are very sorry for the mistake. It has been corrected.

**VERSION 2 – REVIEW**

<b>REVIEWER</b>	Jian-Qiang Wang Central South University, China
<b>REVIEW RETURNED</b>	18-Oct-2018

<b>GENERAL COMMENTS</b>	The author(s) revised the manuscript. In my opinion the manuscript should be acceptable.
-------------------------	--

<b>REVIEWER</b>	Susan Shaheen UC Berkeley
<b>REVIEW RETURNED</b>	16-Oct-2018

<b>GENERAL COMMENTS</b>	The authors have addressed reviewer comments
-------------------------	--

<b>REVIEWER</b>	Jay Maddock Texas A&M University, USA
<b>REVIEW RETURNED</b>	18-Oct-2018
<b>GENERAL COMMENTS</b>	The authors have done a good job of addressing my original concerns. I have no additional suggestions.