Analyzing the Effects of Different Signs to Increase the Opportunity of Designated Van Accessible Parking Spaces

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Statement of Problem

The research problem addressed by the current study is

• To obtain the social significance of designated van accessible parking spaces being taken by non ramp or lift equipped vehicle (NRLEV) users and the social appropriateness of signage intervention;

• To evaluate whether intervention signs for designated van accessible parking can provide better prompts for drivers with accessible parking permits to allow ramp or lift equipped vehicles (RLEV) to park in their designated spaces compared with the current signage.

• NRLEV: non ramp- or lift- equipped vehicle
• RLEV: ramp- or lift- equipped vehicle
Presentation Overview

• Introduction

• Study 1
  o Qualitative study: Focus group
  o Qualitative study: Brief interviews

• Study 2
  o Quantitative study: Multi-component analysis with an embedded reversal design

• Discussion
Introduction

The configuration of accessible parking spaces
Introduction

The importance of accessible parking

- Independent living and community participation (Mann, McCarthy, Wu, & Tomita, 2005; WHO, 2001)

- Legislation such as The Americans With Disabilities Act (ADA) has resulted in federal regulations that include the Americans With Disabilities Accessibility Guidelines (ADAAG) (2004) and 2010 ADA Standards for Accessible Design to ensure accessibility of the built environment, including accessible parking, developed under the guidance of the US Access Board.
Introduction

Previous studies on violation of accessible parking spaces
  • Experimental Intervention to deter violation
    o Jason and Jung (1984), vertical signs plus ground markings > ground markings alone
    o Suarez de Balcazar, Fawcett and Balcazar (1988), combined effect of upright signs and police enforcement
    o White, Jones, Ulicny, Powell and Matthews (1988), signs with a warning indicating the consequences for violation of handicap parking ordinances > standard signs
Introduction

Previous studies on violation of accessible parking spaces

• Experimental Intervention to deter violation
  o Cope, Allred, and Morsel (1991), ground signs plus the vertical signs and message sign containing the social sanction, "Warning this space watched by concerned citizens" worked best in reducing violations
  o Cope, Lanier and Allred (1995), the content of the message was more important than the increased salience of the sign
  o Taylor (1998), the presence of actors with a physical disability resulted in a lower rate of handicapped parking violations
Introduction

• A newly-emerging problem: Designated van accessible parking spaces are taken by NRLEV users with accessible parking permits
  o RLEV users’ frustration when encountering designated van accessible parking spots occupied by NRLEV with an accessible parking placard, parked next to an unoccupied standard accessible parking spot (Zielinski, 2010; Vogel, 2012).

  o Anecdotal evidence: personal experiences of Dr. Nary and Dr. White as RLEV users
Introduction

• How can earlier studies on violation of accessible parking spaces contribute to a better understanding of the current problem?
  o Direct observation
  o Single subject design
  o Modifying existing vertical signs with different messages (antecedent stimulus)
  o Observation time: rush hour
Introduction

• Research questions

  o Is designated van accessible parking spaces being taken by NRLEV users a problem of social significance to RLEV users?

  o Does a more salient van accessible parking sign reduce the number of NRLEVs that park in designated van accessible parking spaces?
Method

• Mixed methods approach

  o Qualitative: focus group and brief interviews

  o Quantitative: single subject design
Study 1 Qualitative Study: Focus Group

Recruitment

• A recruitment flyer distributed through Independence, Inc. and United Access

• $25 ClinCard
Study 1 Qualitative Study: Focus Group

Procedure

• Conference room of Independence, Inc.
• A facilitator, a recorder, a note taker
• Consent form
• 1.5 hours
Study 1 Qualitative Study: Focus Group

Procedure

• A demographic questionnaire before the focus group discussion (people with and without disabilities)

• An evaluation survey following the focus group discussion

• Transcribing

• Coding

• Peer debriefing
Study 1 Qualitative Study: Focus Group

Results

• Demographic information
  • 12 participants, 6 males. Ten were people with disabilities and 2 were caretakers who drove for people with disabilities, aged from 31 to 69 years.

  • The mean of participants’ disability duration was 23.75 years, ranging from 3.5 to 49 years. The mean years of driving was 7.1 years, ranging from 1 to 24 years.

  • The mean years of driving with an accessible parking permit for 2 personal care attendants was 16 years, ranging from 7 to 25 years.
Study 1 Qualitative Study: Focus Group

Results

• Focus group analysis: 4 major categories and 14 subcategories
  o Reasons for NRLEV users taking the designated van accessible parking spaces
    - The fact is that I don’t see it very often making a difference. I don’t think it’s effective at all. It’s worded van accessible. So like you said, the wording may make a difference. Not necessarily every time, but I think the sign doesn’t make much difference. (Jack)
  o Ineffectiveness of the sign
    - I would often take it because it was available and it would be closer to the door. (Ray)
  o Availability and closeness to the entrance
    - They were parking at the handicapped parking. And she has a minivan. And my niece said, grandma, what are you doing? And she said, well, it is a handicapped van spot. And they said that’s not what they mean. (Becky)
  o Ignorance or lack of understanding
Examples
Examples Cont.
Study 1 Qualitative Study: Focus Group

Results: Evaluation of the Focus Group

Table 1
Evaluation of the Focus Group
(Question 1 to 7, 1 = strongly disagree, 5 = strongly)

<table>
<thead>
<tr>
<th>Question</th>
<th>M (n = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The topics discussed were interesting.</td>
<td>4.85</td>
</tr>
<tr>
<td>2. The questions were easy to understand.</td>
<td>4.38</td>
</tr>
<tr>
<td>3. We were given enough time for discussion.</td>
<td>4.08</td>
</tr>
<tr>
<td>4. The facilitators encouraged participation.</td>
<td>4.77</td>
</tr>
<tr>
<td>5. The facilitator kept the group focused and on task.</td>
<td>4.38</td>
</tr>
<tr>
<td>6. I got a chance to have my say.</td>
<td>4.92</td>
</tr>
<tr>
<td>7. I felt that I was listened to.</td>
<td>5</td>
</tr>
<tr>
<td>8. Overall, the focus group was (4 = great, 3 = good, 2 = ok, 1 = poor).</td>
<td>3.62</td>
</tr>
<tr>
<td>9. The facilitators were (4 = great, 3 = good, 2 = ok, 1 = boring).</td>
<td>3.62</td>
</tr>
</tbody>
</table>
Study 1 Qualitative Study: Brief Interviews

Participants
• Ten NRLEV users who parked in the designated van accessible parking space with official tags or license plates. 7 females and 3 males

Setting
• A site containing a parking lot with high turnover, a designated van accessible parking space and the adjacent standard accessible parking space
Study 1 Qualitative Study: Brief Interview

Procedure

- The interviewer was unobtrusively located in front of the store, which allowed a good view of the accessible parking spaces.

- The interviewer politely approached the identified participant and asked the participant’s oral consent to participate in a quick 2-3 minute interview.

- The questions were centered on whether the drivers could distinguish the regular accessible parking signs from the van accessible parking signs.
Study 1 Qualitative Study: Brief Interview

Results

• Sign recognition: 6 indicated that they parked in the regular accessible parking sign space

• Most participants considered van accessible parking space as larger space, for wheelchair user, van user.

• Some indicated that they would take the space if it’s available.
Study 1 Qualitative Study: Brief Interview

Results

• Interview question
  o Do you think a “van” should be ramp or lift equipped to park in the “van accessible” space?

• Responses:
  o Four participants stated that it was unnecessary that the van should be ramp or lift equipped to park in the van accessible space.

  o Three participants said yes, but one participant added that she would park there if no other spaces were available.
Summary of the qualitative study

• Validated the social importance of the research problem and the appropriateness of the intervention procedure of Study 2

• Multiple variables contributed to the research problem
  o no history of consequences of NRLEV users taking the designated van parking space,
  o confusion with the designated van accessible parking sign,
  o configuration of the accessible parking spaces, etc.

• One possible solution: revision of the designated van accessible parking sign
Study 2 Experimental Study

Method

• Participants
  o NRLEV and RLEV users who parked in the two observed accessible parking spaces at observation sites A and B.

  o The participants parked in the spaces with various vehicles such as cars, trucks, SUVs, vans, and RLEVs.
Study 2 Experimental Study

Method
- Settings

<table>
<thead>
<tr>
<th>Store A</th>
<th>Store B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designated van accessible parking space</td>
<td>Designated van accessible parking space</td>
</tr>
<tr>
<td>Regular accessible parking space</td>
<td>Regular accessible parking space</td>
</tr>
</tbody>
</table>
Study 2 Experimental Study

Method

• Observation and measurement
  o Four undergraduate students and the researchers served as observers
  o Off site and onsite training
  o Inter-observer reliability
  o April to July of 2014, Monday through Sunday between 11:00 a.m. and 1:30 p.m., and between 4:00 and 6:30 p.m.
  o Each observation interval lasted for an hour, and two consecutive sessions could be conducted with a half hour break in between them
Study 2 Experimental Study

Method

• Observation and measurement
  o The observers sat in a parked vehicle that allowed a clear view of the to-be-observed areas several parking spaces away.
  o Or, the observers were in an unobtrusive location near the front of the store about 15-20 meters from the observed spot.
  o Observers went to the target spaces when necessary to determine if a vehicle had an accessible parking tag or license plate after the driver had entered the store.
Study 2 Experimental Study

Method

• Observation and measurement
  o Instantaneous recording method (Cooper, Heron, & Heward, 1987). 1-minute time interval using GYMBOSS miniMAX interval timers
  o Scoring form
<table>
<thead>
<tr>
<th>(NV) Non van</th>
<th>When a designated van accessible space is occupied by a non ramp/lift vehicle.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(V) Van parking</td>
<td>When a designated van accessible space is occupied by a ramp/lift van.</td>
</tr>
<tr>
<td>Regular ADA Parking Space</td>
<td>The regular ADA space is occupied.</td>
</tr>
<tr>
<td>(O) Occupied</td>
<td>The van identified space or the regular ADA space is occupied by objects other than vehicles and is not available for parking (e.g., shopping cart).</td>
</tr>
<tr>
<td>Both of Van Accessible and Regular ADA Parking Space</td>
<td>The van identified space or the regular ADA space is available.</td>
</tr>
<tr>
<td>(N) Not available</td>
<td>When the van identified space or the regular ADA space is occupied by a vehicle without a displayed access permit/license.</td>
</tr>
<tr>
<td>(I) Illegal parking</td>
<td>When a van identified or regular ADA space is occupied by a different vehicle.</td>
</tr>
<tr>
<td>(×) New vehicle</td>
<td>When a van identified or regular ADA space is occupied by a vehicle with a different vehicle.</td>
</tr>
</tbody>
</table>

Diagonal Parking

D(Diagonal parking) | The vehicle parks over the diagonal lines painted on ramp accessible aisles. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(N) Not available</td>
<td>When the diagonal line area (access aisle) is occupied by any objects (e.g., shopping carts, vehicles).</td>
</tr>
</tbody>
</table>

Note:
1. All spaces are accessible. 2. Parking space = space

<table>
<thead>
<tr>
<th>Date:</th>
<th>Observer:</th>
<th>Location:</th>
<th>Time start:</th>
<th>Time stop:</th>
<th>Condition:</th>
<th>Session number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (minute)</td>
<td>Van Accessible Space</td>
<td>Diagonal Parking</td>
<td>Regular ADA Space</td>
<td>Time (minute)</td>
<td>Van Accessible Space</td>
<td>Diagonal Parking</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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<td>32</td>
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<tr>
<td>3</td>
<td></td>
<td></td>
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<td>33</td>
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<tr>
<td>4</td>
<td></td>
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<td>34</td>
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<td>5</td>
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<td>6</td>
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<td>36</td>
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<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Study 2 Experimental Study

Method

• Dependent variables
  o The percentage of deterrence of NRLEV: the number of NRLEV drivers who intended to park in the designated van accessible space but withdrew and parked elsewhere when saw the intervention signs, divided by the total vehicles that parked or intended to park in the designated van accessible space per session.
  o The occurrence of NRLEV (opportunity): the occurrence of NRLEV parked in the observed designated van accessible space per session.
Study 2 Experimental Study

Method

Figure 1. Current accessible parking sign
Study 2 Experimental Study

Method

*Figure 2. Intervention Signs.*
Study 2 Experimental Study

Method

• Experimental Design
  o A multi-component analysis to compare the effects of the intervention signs
  o A reversal design to test and validate the most effective intervention effects
  o Follow up: observations were conducted five weeks later at store A and four weeks later at store B to check for durability of the intervention effects over time
Study 2 Experimental Study

Deterrence Results

Range: 1-4, M=2.8

Range: 1-5, M=2.7

Range: 2-5, M=3.3

Range: 1-4, M=2.5

Range: 2-4, M=3.2

Range: 1-5, M=3.4

Range: 1-3, M=2.3

Range: 2-3, M=2.1

Range: 2-3, M=2.7

Range: 0-3, M=1.3

Range: 0-3, M=1.6

Range: 1-4, M=1.7

Range: 0-3, M=1.8

Range: 1-4, M=1.9

Range: 1-2, M=1.6

Range: 0-4, M=1.8

Range: 1-2, M=1.5

Range: 0-4, M=1.6

36
Study 2

Occurrence of NPSV per Line

Store A

Store B

37
Study 2 Experimental Study

Inter-observer Reliability

• For store A, the overall average inter-observer reliability was 99.43%, and ranged from 87.50% to 100%.

• For store B, the overall average inter-observer reliability was 99.86%, and the range was from 98.89% to 100%.
Summary of the Quantitative Study

• The signage interventions had small to moderate effects in deterring NRLEV users parking in the designated van accessible parking spaces

• The courteous sign was most effective at store A and the warning sign was most effective at store B.
Discussion

Lessons Learned

• The current research problem is of critical importance for community participation and inclusion of RLEV users, especially considering that the group of RLEV users has been increasing.

• The signage intervention provided a small to moderate effect in reducing the occurrences of NRLEV taking the designated van accessible parking space and in increasing the opportunity for RLEV users to park.

• Other factors contributing to the current problem might include: no history of consequences for NRLEV drivers parking in the designated van accessible spaces, and lack of awareness, etc.
Discussion

Future research

• Conduct more focus groups and interviews of both NRLEV users and RLEV users across rural and urban areas.

• Implement intervention studies in more diverse settings such as hospital and campus parking lots to develop a sign that works effectively in general.

• Revise public policies to provide a clearer differentiation between regular accessible parking spaces and designated van accessible parking spaces, along with contingencies for NRLEV drivers who park in designated van accessible parking spaces.

• Conduct an education campaign among the disability community to raise awareness about the rationale and usage of the designated van accessible parking space.
Thank you!
Study 1 Qualitative Study: Focus Group

Results
• Focus group analysis: 4 major categories and 14 subcategories
  o Barriers to finding van accessible parking spaces
    I go to the basketball games or whatever, maybe an hour ahead of time, cause all the van spaces are taken by non-van vehicles. (Ray)
  o Designated van accessible parking spaces being taken by NRLEV
    I go a variety of places, restaurants, doctor offices, and ....they have to have handicapped spot, but once it is specifically for van, it’s rare. (Jack)
  o Rarity of designated van accessible parking spaces
  o Importance of designated van accessible parking spaces for RLEV users
    I like the van with wide grid cause when you come out, you have room to come out of your wheelchair. It seems anybody cross anyway over. So get the narrow grid, you cannot get out when they cross over. So I prefer the van. (Jack)
Study 1 Qualitative Study: Focus Group

Results

• Focus group analysis: 4 major categories and 14 subcategories
  o Coping strategies
    o Park far away
    o Drop off at the door
    o Van with lift coming out at the back

A lot of times my solution is to park far out and park sideways. (Ken)

I’ve dropped off at the door. (Dunstan)

The first thing on the back of my mind was to get a van with the lift coming out at the back cause the lack of parking. In that way, I can park anywhere in any store and be able to load and unload. (Ken)
Study 1 Qualitative Study: Focus Group

• Results
  o Focus group analysis: 4 major categories and 14 subcategories
    o Suggestions
      o Revision of the current van accessible parking sign
      o Separate permit or placard for RLEV
      o All large hash mark areas

Anyway, I would agree that they need a van only instead of just a van accessible. The same reason. (Steven)

When you get your car tag, you have to fill that out saying what type of vehicle. I actually have been thinking about it a lot since I got this request. I thought like the color coding of the tags and the spots match them, red goes red and blue goes blue. (Becky)

Yeah, I think I heard that Wichita has their local code. All the accessible parking spaces should be at least 11 feet wide with 5 feet access aisle, so that’s 16 feet, which is the van overall width. (Bobby)
Study 1 Qualitative Study: Focus Group

Results

• Focus group analysis: 4 major categories and 14 subcategories
  ○ Suggestions
    o Put van accessible parking spaces further to the entrance than the regular accessible parking spaces
  ○ Education campaign
    Advertising campaign, an awareness campaign. They do it for everything. (Ken)

Most people are looking for the closet spot. If the van are close to the entrance, they are gonna use it. (Jack)
Introduction

The configuration of accessible parking spaces

- **Signage**: International symbol of accessibility placed in front of the parking space mounted at least five feet above the ground, measured to the bottom of the sign. Van accessible spaces include the designation "van accessible".

- **Van Accessible Spaces**: 2010 Standards—one for every six accessible spaces (1991 Standards required one for every eight).

- **Space width for car**: Eight feet

- **Access aisle**: Width: five feet (if aisle serves car and van spaces)

- **Space width for van**: 11 feet (although it may be eight feet wide if its access aisle is eight feet wide)
Introduction

Previous studies on violation of accessible parking spaces

• Violation rate
  o Matthews (1981), the observed violation rate was 76.1% and most violators were aware that the spaces were reserved through interview
  o Estes, Moore, and Dolezal (2004), the observed violation rate was 15.2%
Introduction

Previous studies on violation of accessible parking spaces

• Personal and behavioral characteristics of violators
  o Allred and Cope (1990), male college-age students who were smokers, frequent drinkers, and who drove after drinking. Situational conditions related to violations included type of sign, weather, and available rewards or punishments
  
  o Cope and Allred (1990), rainy weather and young drivers
Introduction

Previous studies on violation of accessible parking spaces

• Personal and behavioral characteristics of violators
  o Estes, Moore, and Dolezal (2004), rush hour time, (i.e., between the hours of 4:30-6:30 p.m.).
  o Fletcher (1995), male, non-white, and young
  o Fletcher (2001), guilt, violators were more likely to park in the least conspicuous parking spaces.