**Attachment 1.** Sample size comparison between original and revised experimental design

1. **Within-Subject Design (Original study design, described in 60-day Federal Register Notice)**

Table Original Study Design

|  |  |  |
| --- | --- | --- |
|   | Part-time users (n=16) | Non-seat belt users (n=16) |
|   | Young driver (n=8) | Middle-aged driver (n=8) | Young driver (n=8) | Middle-aged driver (n=8) |
|   | Male(n=4) | Female (n=4) | Male(n=4) | Female (n=4) | Male(n=4) | Female (n=4) | Male(n=4) | Female (n=4) |
| Baseline (A/B) | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Treatment A | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Treatment B | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

|  |  |
| --- | --- |
| **Research questions** | **Sample size for comparison** |
| Comparison between Baseline A and Treatment A | n=16 |
| Comparison between Baseline B and Treatment B | n=16 |
| Comparison between part-time user and non-seatbelt user | n=16 |
| Comparison between A and B | n=32 |
| Comparison between young and middle-aged | n=16 |
| The interaction effect of System (A/B) \*age  | n=16 |
| The interaction effect of System (A/B) \*belt user group | n=16 |
| The interaction effect of System (A/B) \*gender | n=16 |
| The interaction effect of System (A/B) \*age\*belt user group | n=8 |
| The interaction effect of System (A/B) \*age\*gender | n=8 |

1. **Between-Subject Design (Revised study design, subject to funding availability)**

Table Revised Study Design

|  |  |  |
| --- | --- | --- |
| Test Condition  | Part-time users (n=24) | Non-seat belt users (n=24) |
| Young driver (n=12) | Middle-aged driver (n=12) | Young driver (n=12) | Middle-aged driver (n=12) |
| Male(n=6) | Female (n=6) | Male(n=6) | Female (n=6) | Male(n=6) | Female (n=6) | Male(n=6) | Female (n=6) |
| Baseline A | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Treatment A | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Baseline B | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Treatment B | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

|  |  |
| --- | --- |
| **Research questions** | **Sample size for comparison** |
| Comparison between Baseline A and Treatment A | n=24 |
| Comparison between Baseline B and Treatment B | n=24 |
| Comparison between part-time user and non-seatbelt user | n=24 |
| Comparison between A and B | n=24 |
| Comparison between young and middle-aged | n=24 |
| The interaction effect of System (A/B) \*age  | n=12 |
| The interaction effect of System (A/B) \*belt user group | n=12 |
| The interaction effect of System (A/B) \*gender | n=12 |
| The interaction effect of System (A/B) \*age\*belt user group | n=6 |
| The interaction effect of System (A/B) \*age\*gender | n=6 |

Table Additional Cost to Implement Revised Study Design

|  |  |  |
| --- | --- | --- |
| ID | Description | Cost Estimate |
| 1 | Cost increase in labor charges due to increased subject sample size and engineering support (i.e., increased labor in vehicle installation, data maintenance & download, server maintenance, subject recruitment and data analysis) | $84,330.24 |
| 2 | Cost increase in research supplies (i.e.; vehicle insurance cost, gas and instrumentation) | $21,934.00 |
| 3 | Subject fees ($90/subject \* (16 more subjects+8more drop outs) | $2,680.00 |
| 4 | OEM Costs (i.e., extended vehicle rental period | $12,886.80 |
| 5 | Indirect costs on research supplies and subject fees | $13,594.34 |
| TOTAL | $135,425.38 |