### Additional file 4: Rankings of major and minor research misbehaviors

#### Additional file 4.1: Ranking according to frequency

<table>
<thead>
<tr>
<th>Rank</th>
<th>Research Misbehavior</th>
<th>Frequency (mean)</th>
<th>Lower 95% confidence limit</th>
<th>Upper 95% confidence limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Selectively cite or cite your own work to improve citation metrics (R)</td>
<td>3.70</td>
<td>3.24</td>
<td></td>
</tr>
<tr>
<td>4.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Demand or accept an authorship for which one does not qualify (C)</td>
<td>3.68</td>
<td>3.29</td>
<td></td>
</tr>
<tr>
<td>4.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Selectively cite to enhance your own findings or convictions (R)</td>
<td>3.54</td>
<td>3.14</td>
<td></td>
</tr>
<tr>
<td>3.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Add an author who doesn’t qualify for authorship (C)</td>
<td>3.54</td>
<td>3.09</td>
<td></td>
</tr>
<tr>
<td>3.98</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Turn a blind eye to putative breaches of research integrity by others ..</td>
<td>3.50</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>4.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Not publish a valid 'negative' study (R)</td>
<td>3.44</td>
<td>3.10</td>
<td></td>
</tr>
<tr>
<td>3.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Insufficiently supervise or mentor junior coworkers (C)</td>
<td>3.41</td>
<td>3.01</td>
<td></td>
</tr>
<tr>
<td>3.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Keep inadequate notes of the research process (D)</td>
<td>3.41</td>
<td>2.88</td>
<td></td>
</tr>
<tr>
<td>3.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Inadequately handle or store data or (bio)materials (D)</td>
<td>3.36</td>
<td>2.86</td>
<td></td>
</tr>
<tr>
<td>3.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Make no clear distinction between personal views and professional comm..</td>
<td>3.24</td>
<td>2.66</td>
<td></td>
</tr>
<tr>
<td>3.81</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Insufficiently report study flaws and limitations (R)</td>
<td>3.21</td>
<td>2.89</td>
<td></td>
</tr>
<tr>
<td>3.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>3.21</td>
<td>2.75</td>
<td></td>
</tr>
<tr>
<td>3.66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Use published ideas or phrases of others without referencing (R)</td>
<td>3.21</td>
<td>2.82</td>
<td></td>
</tr>
<tr>
<td>3.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Spread study results over more papers than needed (R)</td>
<td>3.17</td>
<td>2.78</td>
<td></td>
</tr>
<tr>
<td>3.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Not report replication problems (R)</td>
<td>3.14</td>
<td>2.75</td>
<td></td>
</tr>
<tr>
<td>3.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Ignore basic principles of quality assurance (D)</td>
<td>3.13</td>
<td>2.68</td>
<td></td>
</tr>
<tr>
<td>3.58</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Perform data-analyses not stated in the study protocol without disclos..</td>
<td>3.13</td>
<td>2.71</td>
<td></td>
</tr>
<tr>
<td>3.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Use unpublished ideas or phrases of others without their permission (C)</td>
<td>3.11</td>
<td>2.74</td>
<td></td>
</tr>
<tr>
<td>3.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Collect more data after noticing that the results are almost statistic..</td>
<td>3.07</td>
<td>2.74</td>
<td></td>
</tr>
<tr>
<td>3.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Report an unexpected finding as having been hypothesized from the star..</td>
<td>3.05</td>
<td>2.46</td>
<td></td>
</tr>
<tr>
<td>3.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Not ask permission by contributors for the wording of the acknowledgem..</td>
<td>3.04</td>
<td>2.65</td>
<td></td>
</tr>
<tr>
<td>3.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Let your convictions influence the conclusions substantially (R)</td>
<td>3.04</td>
<td>2.64</td>
<td></td>
</tr>
<tr>
<td>3.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Not report clearly relevant details of study methods (R)</td>
<td>3.04</td>
<td>2.61</td>
<td></td>
</tr>
<tr>
<td>3.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Report on data-driven hypotheses without disclosure (R)</td>
<td>3.00</td>
<td>2.57</td>
<td></td>
</tr>
<tr>
<td>3.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Not report all study protocol-stipulated results (R)</td>
<td>3.00</td>
<td>2.61</td>
<td></td>
</tr>
<tr>
<td>3.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Take no full responsibility for the integrity of the research project ..</td>
<td>2.95</td>
<td>2.51</td>
<td></td>
</tr>
<tr>
<td>3.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>2.92</td>
<td>2.53</td>
<td></td>
</tr>
<tr>
<td>3.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Omit a contributor who deserves authorship (C)</td>
<td>2.92</td>
<td>2.49</td>
<td></td>
</tr>
<tr>
<td>3.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Refuse sharing data with bona fide colleagues (C)</td>
<td>2.88</td>
<td>2.46</td>
<td></td>
</tr>
<tr>
<td>3.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Handle existing conflicts of interest inadequately (C)</td>
<td>2.87</td>
<td>2.46</td>
<td></td>
</tr>
<tr>
<td>3.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Write no or a clearly inadequate research protocol (S)</td>
<td>2.84</td>
<td>2.44</td>
<td></td>
</tr>
<tr>
<td>3.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rank</td>
<td>Research Misbehavior</td>
<td>Truth (mean)</td>
<td>Lower 95% confidence limit</td>
<td>Upper 95% confidence limit</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Fabricate data (D)</td>
<td>4.63</td>
<td>4.43</td>
<td>4.84</td>
</tr>
<tr>
<td>2</td>
<td>Selectively delete data, modify data or add fabricated data after perf..</td>
<td>4.37</td>
<td>4.10</td>
<td>4.62</td>
</tr>
<tr>
<td>3</td>
<td>Modify the results or conclusions of a study due to pressure of a spon..</td>
<td>4.36</td>
<td>4.13</td>
<td>4.59</td>
</tr>
<tr>
<td>4</td>
<td>Choose a clearly inadequate research design or using evidently unsuita..</td>
<td>4.18</td>
<td>3.93</td>
<td>4.42</td>
</tr>
<tr>
<td>5</td>
<td>Conceal results that contradict your earlier findings or convictions (R)</td>
<td>4.04</td>
<td>3.78</td>
<td>4.31</td>
</tr>
<tr>
<td>6</td>
<td>Delete data before performing data analysis without disclosure (R)</td>
<td>4.02</td>
<td>3.71</td>
<td>4.34</td>
</tr>
<tr>
<td>7</td>
<td>Review your own papers (C)</td>
<td>4.00</td>
<td>3.57</td>
<td>4.43</td>
</tr>
<tr>
<td>Rank</td>
<td>Research Misbehavior</td>
<td>Trust (mean)</td>
<td>Lower 95% confidence limit</td>
<td>Upper 95% confidence limit</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Fabricate data (D)</td>
<td>4.70</td>
<td>4.51</td>
<td>4.89</td>
</tr>
<tr>
<td>2</td>
<td>Selectively delete data, modify data or add fabricated data after perf.</td>
<td>4.48</td>
<td>4.22</td>
<td>4.69</td>
</tr>
<tr>
<td>3</td>
<td>Refuse to respond to an allegation of a breach of research integrity (C)</td>
<td>4.48</td>
<td>4.22</td>
<td>4.69</td>
</tr>
<tr>
<td>4</td>
<td>Refuse to respond to an allegation of a breach of research integrity (C)</td>
<td>4.40</td>
<td>4.15</td>
<td>4.66</td>
</tr>
<tr>
<td>5</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>4.37</td>
<td>4.10</td>
<td>4.64</td>
</tr>
<tr>
<td>6</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>4.20</td>
<td>4.10</td>
<td>4.64</td>
</tr>
<tr>
<td>7</td>
<td>Disregard results that contradict your earlier findings or convictions (R)</td>
<td>3.94</td>
<td>3.67</td>
<td>4.20</td>
</tr>
<tr>
<td>8</td>
<td>Disregard results that contradict your earlier findings or convictions (R)</td>
<td>3.90</td>
<td>3.60</td>
<td>4.20</td>
</tr>
</tbody>
</table>
Additional file 4.4: Ranking according to preventability

<table>
<thead>
<tr>
<th>Rank</th>
<th>Research Misbehavior</th>
<th>Prevent-ability (mean)</th>
<th>Lower 95% confidence limit</th>
<th>Upper 95% confidence limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ignore substantial safety risks of the study to participants, workers ..</td>
<td>3.91</td>
<td>3.58</td>
<td>4.25</td>
</tr>
<tr>
<td>2</td>
<td>Review your own papers (C)</td>
<td>3.88</td>
<td>3.47</td>
<td>4.30</td>
</tr>
<tr>
<td>3</td>
<td>Ignore basic principles of quality assurance (D)</td>
<td>3.83</td>
<td>3.61</td>
<td>4.05</td>
</tr>
<tr>
<td>4</td>
<td>Use published ideas or phrases of others without referencing (R)</td>
<td>3.81</td>
<td>3.55</td>
<td>4.08</td>
</tr>
<tr>
<td>5</td>
<td>Inadequately handle or store data or (bio)materials (D)</td>
<td>3.79</td>
<td>3.50</td>
<td>4.08</td>
</tr>
<tr>
<td>6</td>
<td>Report an unexpected finding as having been hypothesized from the star..</td>
<td>3.79</td>
<td>3.54</td>
<td>4.04</td>
</tr>
<tr>
<td>7</td>
<td>Give insufficient attention to the equipment, skills or expertise whic..</td>
<td>3.77</td>
<td>3.54</td>
<td>4.00</td>
</tr>
<tr>
<td>8</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>3.75</td>
<td>3.53</td>
<td>3.98</td>
</tr>
<tr>
<td>9</td>
<td>Failure to disclose a sponsor of the study (R)</td>
<td>3.75</td>
<td>3.53</td>
<td>3.98</td>
</tr>
<tr>
<td>10</td>
<td>Perform data-analyses not stated in the study protocol without disclos..</td>
<td>3.75</td>
<td>3.53</td>
<td>3.98</td>
</tr>
<tr>
<td>11</td>
<td>Add an author who doesn't qualify for authorship (C)</td>
<td>3.73</td>
<td>3.50</td>
<td>4.01</td>
</tr>
<tr>
<td>12</td>
<td>Selectively cite or cite your own work to improve citation metrics (R)</td>
<td>3.73</td>
<td>3.50</td>
<td>4.01</td>
</tr>
<tr>
<td>13</td>
<td>Propose study questions which are clearly irrelevant (S)</td>
<td>3.72</td>
<td>3.50</td>
<td>4.01</td>
</tr>
<tr>
<td>14</td>
<td>Collect more data after noticing that the results are almost statistic..</td>
<td>3.71</td>
<td>3.49</td>
<td>4.01</td>
</tr>
<tr>
<td>15</td>
<td>Report an incorrect downwardly rounded p-value (R)</td>
<td>3.71</td>
<td>3.49</td>
<td>4.01</td>
</tr>
<tr>
<td>16</td>
<td>Include findings inaccurately in the media or during ..</td>
<td>3.70</td>
<td>3.47</td>
<td>4.00</td>
</tr>
<tr>
<td>17</td>
<td>Present grossly misleading information in a grant application (C)</td>
<td>3.70</td>
<td>3.47</td>
<td>4.00</td>
</tr>
<tr>
<td>18</td>
<td>Insufficiently report study flaws and limitations (R)</td>
<td>3.70</td>
<td>3.47</td>
<td>4.00</td>
</tr>
<tr>
<td>19</td>
<td>Not report replication problems (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>20</td>
<td>Not share reviewers' comments with all co-authors (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>21</td>
<td>Keep inadequate notes of the research process (D)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>22</td>
<td>Report no or a clearly inadequate research protocol (S)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>23</td>
<td>Let your convictions influence the conclusions substantially (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>24</td>
<td>Choose a clearly inadequate research design or using evidently unsui..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>25</td>
<td>Insufficiently supervise or mentor junior coworkers (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>26</td>
<td>Importantly change the research design during the study without disclo..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>27</td>
<td>Not acknowledge contributors who do not qualify for authorship (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>28</td>
<td>Re-use of previously published data without disclosure (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>29</td>
<td>Submit or resubmit a paper or grant application without consent from a..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>30</td>
<td>Not publish a valid 'negative' study (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>31</td>
<td>Selectively cite to enhance your own findings or convictions (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>32</td>
<td>Make no clear distinction between personal views and professional comm..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>33</td>
<td>Perform data-analyses not stated in the study protocol without disclos..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>34</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>35</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>36</td>
<td>Communicate results to the general public before a peer reviewed publi..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>37</td>
<td>Spread study results over more papers than needed (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>38</td>
<td>Not ask permission by contributors for the wording of the acknowledgem..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>39</td>
<td>Spread study results over more papers than needed (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>40</td>
<td>Communicate results to the general public before a peer reviewed publi..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>41</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>42</td>
<td>Failure to disclose a sponsor of the study (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>43</td>
<td>Perform data-analyses not stated in the study protocol without disclos..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>44</td>
<td>Add an author who doesn't qualify for authorship (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>45</td>
<td>Selectively cite or cite your own work to improve citation metrics (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>46</td>
<td>Propose study questions which are clearly irrelevant (S)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>47</td>
<td>Collect more data after noticing that the results are almost statistic..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>48</td>
<td>Report an unexpected finding as having been hypothesized from the star..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>49</td>
<td>Include findings inaccurately in the media or during ..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>50</td>
<td>Present grossly misleading information in a grant application (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>51</td>
<td>Insufficiently report study flaws and limitations (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>52</td>
<td>Not report replication problems (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>53</td>
<td>Not share reviewers' comments with all co-authors (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>54</td>
<td>Keep inadequate notes of the research process (D)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>55</td>
<td>Report no or a clearly inadequate research protocol (S)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>56</td>
<td>Not acknowledge contributors who do not qualify for authorship (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>57</td>
<td>Re-use of previously published data without disclosure (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>58</td>
<td>Submit or resubmit a paper or grant application without consent from a..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>59</td>
<td>Not publish a valid 'negative' study (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>60</td>
<td>Selectively cite to enhance your own findings or convictions (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>61</td>
<td>Make no clear distinction between personal views and professional comm..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>62</td>
<td>Perform data-analyses not stated in the study protocol without disclos..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>63</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>64</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>65</td>
<td>Communicate results to the general public before a peer reviewed publi..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>66</td>
<td>Spread study results over more papers than needed (R)</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
<tr>
<td>67</td>
<td>Not ask permission by contributors for the wording of the acknowledgem..</td>
<td>3.69</td>
<td>3.46</td>
<td>3.97</td>
</tr>
</tbody>
</table>
Additional file 4.5: Ranking according to product of frequency and impact on validity

<table>
<thead>
<tr>
<th>Rank</th>
<th>Research Misbehavior</th>
<th>Product Truth (mean)</th>
<th>Lower 95% confidence limit</th>
<th>Upper 95% confidence limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insufficiently supervise or mentor junior coworkers (C)</td>
<td>12.59</td>
<td>11.29</td>
<td></td>
</tr>
<tr>
<td>13.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Insufficiently report study flaws and limitations (R)</td>
<td>12.32</td>
<td>10.99</td>
<td></td>
</tr>
<tr>
<td>13.65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Keep inadequate notes of the research process (D)</td>
<td>12.18</td>
<td>10.57</td>
<td></td>
</tr>
<tr>
<td>13.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Turn a blind eye to putative breaches of research integrity by others ..</td>
<td>12.13</td>
<td>10.69</td>
<td></td>
</tr>
<tr>
<td>13.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ignore basic principles of quality assurance (D)</td>
<td>12.04</td>
<td>10.72</td>
<td></td>
</tr>
<tr>
<td>13.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Selectively cite to enhance your own findings or convictions (R)</td>
<td>11.70</td>
<td>10.38</td>
<td></td>
</tr>
<tr>
<td>13.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Not publish a valid 'negative' study (R)</td>
<td>11.49</td>
<td>9.66</td>
<td></td>
</tr>
<tr>
<td>13.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Let your convictions influence the conclusions substantially (R)</td>
<td>11.13</td>
<td>9.72</td>
<td></td>
</tr>
<tr>
<td>12.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Not report clearly relevant details of study methods (R)</td>
<td>11.09</td>
<td>9.62</td>
<td></td>
</tr>
<tr>
<td>12.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.62</td>
<td>Inadequately handle or store data or (bio)materials (D)</td>
<td>10.87</td>
<td>9.12</td>
<td></td>
</tr>
<tr>
<td>12.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Perform data-analyses not stated in the study protocol without disclos..</td>
<td>10.74</td>
<td>9.07</td>
<td></td>
</tr>
<tr>
<td>12.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Not report replication problems (R)</td>
<td>10.51</td>
<td>9.05</td>
<td></td>
</tr>
<tr>
<td>11.98</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Conceal results that contradict your earlier findings or convictions (R)</td>
<td>10.51</td>
<td>9.25</td>
<td></td>
</tr>
<tr>
<td>11.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Choose a clearly inadequate research design or using evidently unsuita..</td>
<td>10.39</td>
<td>9.06</td>
<td></td>
</tr>
<tr>
<td>11.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Handle existing conflicts of interest inadequately (C)</td>
<td>10.36</td>
<td>9.08</td>
<td></td>
</tr>
<tr>
<td>11.64</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Not report all study protocol-stipulated results (R)</td>
<td>10.31</td>
<td>9.05</td>
<td></td>
</tr>
<tr>
<td>11.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Write no or a clearly inadequate research protocol (S)</td>
<td>10.27</td>
<td>8.74</td>
<td></td>
</tr>
<tr>
<td>11.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Unfairly review papers, grant applications or colleagues applying for ..</td>
<td>10.23</td>
<td>8.78</td>
<td></td>
</tr>
<tr>
<td>11.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Delete data before performing data analysis without disclosure (R)</td>
<td>10.10</td>
<td>8.58</td>
<td></td>
</tr>
<tr>
<td>11.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Report on data-driven hypotheses without disclosure (R)</td>
<td>9.97</td>
<td>8.41</td>
<td></td>
</tr>
<tr>
<td>11.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Failure to disclose a relevant financial or intellectual conflict of i..</td>
<td>9.94</td>
<td>8.60</td>
<td></td>
</tr>
<tr>
<td>11.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Make no clear distinction between personal views and professional comm..</td>
<td>9.81</td>
<td>8.44</td>
<td></td>
</tr>
<tr>
<td>11.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Give insufficient attention to the equipment, skills or expertise whic..</td>
<td>9.80</td>
<td>8.35</td>
<td></td>
</tr>
<tr>
<td>11.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Selectively delete data, modify data or add fabricated data after perf..</td>
<td>9.68</td>
<td>8.32</td>
<td></td>
</tr>
<tr>
<td>11.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Importantly change the research design during the study without disclo..</td>
<td>9.56</td>
<td>8.28</td>
<td></td>
</tr>
<tr>
<td>10.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Use published ideas or phrases of others without referencing (R)</td>
<td>9.55</td>
<td>8.23</td>
<td></td>
</tr>
<tr>
<td>10.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Deliberately communicate findings inaccurately in the media or during ..</td>
<td>9.45</td>
<td>7.90</td>
<td></td>
</tr>
<tr>
<td>11.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Propose study questions which are clearly irrelevant (S)</td>
<td>9.33</td>
<td>7.78</td>
<td></td>
</tr>
<tr>
<td>10.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Modify the results or conclusions of a study due to pressure of a spon..</td>
<td>9.12</td>
<td>7.65</td>
<td></td>
</tr>
<tr>
<td>10.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Collect more data after noticing that the results are almost statistic..</td>
<td>8.98</td>
<td>7.66</td>
<td></td>
</tr>
<tr>
<td>10.29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>8.98</td>
<td>7.64</td>
<td></td>
</tr>
<tr>
<td>10.32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Selectively cite or cite your own work to improve citation metrics (R)</td>
<td>8.92</td>
<td>7.83</td>
<td></td>
</tr>
<tr>
<td>10.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Use unpublished ideas or phrases of others without their permission (C)</td>
<td>8.84</td>
<td>7.59</td>
<td></td>
</tr>
<tr>
<td>10.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Fabricate data (D)</td>
<td>8.82</td>
<td>7.69</td>
<td></td>
</tr>
<tr>
<td>9.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Take no full responsibility for the integrity of the research project ..</td>
<td>8.69</td>
<td>7.41</td>
<td></td>
</tr>
<tr>
<td>9.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Re-use of previously published data without disclosure (R)</td>
<td>8.56</td>
<td>7.24</td>
<td></td>
</tr>
<tr>
<td>9.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Not adhere to pertinent laws and regulations (D)</td>
<td>8.53</td>
<td>7.15</td>
<td></td>
</tr>
<tr>
<td>9.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Refuse sharing data with bona fide colleagues (C)</td>
<td>8.45</td>
<td>7.13</td>
<td></td>
</tr>
<tr>
<td>9.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Refuse to respond to an allegation of a breach of research integrity (C)</td>
<td>8.40</td>
<td>7.06</td>
<td></td>
</tr>
<tr>
<td>9.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Report an unexpected finding as having been hypothesized from the star..</td>
<td>8.35</td>
<td>6.59</td>
<td></td>
</tr>
<tr>
<td>10.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Be grossly unfair to your collaborators (C)</td>
<td>8.30</td>
<td>7.09</td>
<td></td>
</tr>
<tr>
<td>9.51</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Demand or accept an authorship for which one does not qualify (C)</td>
<td>8.27</td>
<td>6.96</td>
<td></td>
</tr>
<tr>
<td>9.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Report an incorrect downwardly rounded p-value (R)</td>
<td>8.06</td>
<td>6.49</td>
<td></td>
</tr>
<tr>
<td>8.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Spread study results over more papers than needed (R)</td>
<td>7.69</td>
<td>6.62</td>
<td></td>
</tr>
<tr>
<td>8.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Stop data collection earlier than planned because the results are aire..</td>
<td>7.33</td>
<td>6.12</td>
<td></td>
</tr>
<tr>
<td>8.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>7.20</td>
<td>6.10</td>
<td></td>
</tr>
<tr>
<td>8.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additional file 4.6: Ranking according to product of frequency and impact on trust

<table>
<thead>
<tr>
<th>Rank</th>
<th>Research Misbehavior</th>
<th>Product Trust (mean)</th>
<th>Lower 95% confidence limit</th>
<th>Upper 95% confidence limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use published ideas or phrases of others without referencing (R)</td>
<td>12.08</td>
<td>10.66</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Insufficiently report study flaws and limitations (R)</td>
<td>12.04</td>
<td>10.68</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Turn a blind eye to putative breaches of research integrity by others ..</td>
<td>11.96</td>
<td>10.43</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Insufficiently supervise or mentor junior coworkers (C)</td>
<td>11.81</td>
<td>10.55</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ignore basic principles of quality assurance (D)</td>
<td>11.76</td>
<td>10.40</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Unfairly review papers, grant applications or colleagues applying for ..</td>
<td>11.71</td>
<td>10.15</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Use unpublished ideas or phrases of others without their permission (C)</td>
<td>11.41</td>
<td>10.04</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Demand or accept an authorship for which one does not qualify (C)</td>
<td>11.24</td>
<td>9.82</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Inadequately handle or store data or (bio)materials (D)</td>
<td>11.18</td>
<td>9.50</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Keep inadequate notes of the research process (D)</td>
<td>10.93</td>
<td>9.32</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Not publish a valid 'negative' study (R)</td>
<td>10.92</td>
<td>9.24</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Selectively cite to enhance your own findings or convictions (R)</td>
<td>10.75</td>
<td>9.42</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Not report clearly relevant details of study methods (R)</td>
<td>10.70</td>
<td>9.28</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Failure to disclose a relevant financial or intellectual conflict of i..</td>
<td>10.61</td>
<td>9.20</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Be grossly unfair to your collaborators (C)</td>
<td>10.59</td>
<td>9.18</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Handle existing conflicts of interest inadequately (C)</td>
<td>10.55</td>
<td>9.24</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Deliberately communicate findings inaccurately in the media or during ..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Refuse sharing data with bona fide colleagues (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Not report all study protocol-stipulated results (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Let your convictions influence the conclusions substantially (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Selectively cite or cite your own work to improve citation metrics (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Not report replication problems (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Conceal results that contradict your earlier findings or convictions (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Selectively delete data, modify data or add fabricated data after perf..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Delete data before performing data analysis without disclosure (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Report on data-driven hypotheses without disclosure (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Re-use of previously published data without disclosure (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Add an author who doesn’t qualify for authorship (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Write no or a clearly inadequate research protocol (S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Make no clear distinction between personal views and professional comm..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Perform data-analyses not stated in the study protocol without disclos..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Modify the results or conclusions of a study due to pressure of a spon..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Take no full responsibility for the integrity of the research project ..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Importantly change the research design during the study without disclo..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Give insufficient attention to the equipment, skills or expertise whic..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Omit a contributor who deserves authorship (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Propose study questions which are clearly irrelevant (S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Fabricate data (D)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Choose a clearly inadequate research design or using evidently unsuita..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Not adhere to pertinent laws and regulations (D)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Duplicate publication without disclosure (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Refuse to respond to an allegation of a breach of research integrity (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Ignore substantial risks of the expected findings for society or envir..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Spread study results over more papers than needed (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Report an incorrect downwardly rounded p-value (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Submit or resubmit a paper or grant application without consent from a..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Collect more data after noticing that the results are almost statistic..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Report an unexpected finding as having been hypothesized from the star..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Not acknowledge contributors who do not qualify for authorship (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Not ask permission by contributors for the wording of the acknowledgem..</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Present grossly misleading information in a grant application (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Demand, accept or offer substantial gifts for doing a favor (C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rank</td>
<td>Research Misbehavior</td>
<td>Product Prevent-ability (mean)</td>
<td>Lower 95% confidence limit</td>
<td>Upper 95% confidence limit</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Insufficiently supervise or mentor junior coworkers (C)</td>
<td>12.96</td>
<td>11.57</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Inadequately handle or store data or (bio)materials (D)</td>
<td>11.97</td>
<td>10.22</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Use published ideas or phrases of others without referencing (R)</td>
<td>11.91</td>
<td>10.49</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Keep inadequate notes of the research process (D)</td>
<td>11.89</td>
<td>10.37</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ignore basic principles of quality assurance (D)</td>
<td>11.40</td>
<td>10.11</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Not report clearly relevant details of study methods (R)</td>
<td>11.24</td>
<td>9.51</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Insufficiently report study flaws and limitations (R)</td>
<td>11.15</td>
<td>9.91</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Not publish a valid 'negative' study (R)</td>
<td>11.08</td>
<td>9.52</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Selectively cite to enhance your own findings or convictions (R)</td>
<td>10.96</td>
<td>9.68</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>10.90</td>
<td>9.56</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Demand or accept an authorship for which one does not qualify (C)</td>
<td>10.84</td>
<td>9.34</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>10.66</td>
<td>9.14</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Not ask permission by contributors for the wording of the acknowledgements</td>
<td>10.49</td>
<td>9.07</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Selectively cite or cite your own work to improve citation metrics (R)</td>
<td>10.47</td>
<td>9.26</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Spread study results over more papers than needed (R)</td>
<td>10.45</td>
<td>9.27</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Write no or a clearly inadequate research protocol (S)</td>
<td>10.43</td>
<td>8.93</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Add an author who doesn’t qualify for authorship (C)</td>
<td>10.37</td>
<td>8.94</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Duplicate publication without disclosure (R)</td>
<td>10.30</td>
<td>9.05</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Turn a blind eye to putative breaches of research integrity by others ..</td>
<td>10.23</td>
<td>8.95</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Give insufficient attention to the equipment, skills or expertise which..</td>
<td>9.92</td>
<td>8.45</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Handle existing conflicts of interest inadequately (C)</td>
<td>9.85</td>
<td>8.63</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Not report all study protocol-stipulated results (R)</td>
<td>9.84</td>
<td>8.54</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Be grossly unfair to your collaborators (C)</td>
<td>9.80</td>
<td>8.56</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Perform data-analyses not stated in the study protocol without disclosure..</td>
<td>9.60</td>
<td>7.96</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Submit or resubmit a paper or grant application without consent from a..</td>
<td>9.56</td>
<td>8.44</td>
<td></td>
</tr>
</tbody>
</table>

**Additional file 4.7: Ranking according to product of frequency and preventability**
<table>
<thead>
<tr>
<th>No.</th>
<th>Action</th>
<th>Score 1</th>
<th>Score 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Use unpublished ideas or phrases of others without their permission (C)</td>
<td>9.51</td>
<td>8.21</td>
</tr>
<tr>
<td>27</td>
<td>Not acknowledge contributors who do not qualify for authorship (C)</td>
<td>9.43</td>
<td>8.06</td>
</tr>
<tr>
<td>28</td>
<td>Importantly change the research design during the study without disclo..</td>
<td>9.38</td>
<td>8.10</td>
</tr>
<tr>
<td>29</td>
<td>Not report replication problems (R)</td>
<td>9.35</td>
<td>8.09</td>
</tr>
<tr>
<td>30</td>
<td>Choose a clearly inadequate research design or using evidently unsuita..</td>
<td>9.27</td>
<td>8.01</td>
</tr>
<tr>
<td>31</td>
<td>Re-use of previously published data without disclosure (R)</td>
<td>9.25</td>
<td>7.98</td>
</tr>
<tr>
<td>32</td>
<td>Report on data-driven hypotheses without disclosure (R)</td>
<td>9.23</td>
<td>7.91</td>
</tr>
<tr>
<td>33</td>
<td>Omit a contributor who deserves authorship (C)</td>
<td>9.15</td>
<td>8.01</td>
</tr>
<tr>
<td>34</td>
<td>Failure to disclose a relevant financial or intellectual conflict of i..</td>
<td>9.10</td>
<td>7.87</td>
</tr>
<tr>
<td>33</td>
<td>Propose study questions which are clearly irrelevant (S)</td>
<td>9.06</td>
<td>7.46</td>
</tr>
<tr>
<td>36</td>
<td>Take no clear distinction between personal views and professional comm..</td>
<td>8.95</td>
<td>7.72</td>
</tr>
<tr>
<td>37</td>
<td>Take no full responsibility for the integrity of the research project ..</td>
<td>8.80</td>
<td>7.51</td>
</tr>
<tr>
<td>38</td>
<td>Report an unexpected finding as having been hypothesized from the star..</td>
<td>8.74</td>
<td>6.95</td>
</tr>
<tr>
<td>39</td>
<td>Unfairly review papers, grant applications or colleagues applying for ..</td>
<td>8.73</td>
<td>7.42</td>
</tr>
<tr>
<td>40</td>
<td>Let your convictions influence the conclusions substantially (R)</td>
<td>8.65</td>
<td>7.42</td>
</tr>
<tr>
<td>41</td>
<td>Refuse sharing data with bona fide colleagues (C)</td>
<td>8.57</td>
<td>7.18</td>
</tr>
<tr>
<td>42</td>
<td>Deliberately communicate findings inaccurately in the media or during ..</td>
<td>8.50</td>
<td>7.11</td>
</tr>
<tr>
<td>43</td>
<td>Delete data before performing data analysis without disclosure (R)</td>
<td>8.45</td>
<td>7.20</td>
</tr>
<tr>
<td>44</td>
<td>Report an incorrect downwardly rounded p-value (R)</td>
<td>8.42</td>
<td>6.80</td>
</tr>
<tr>
<td>45</td>
<td>Not adhere to pertinent laws and regulations (D)</td>
<td>8.42</td>
<td>7.16</td>
</tr>
<tr>
<td>46</td>
<td>Collect more data after noticing that the results are almost statistic..</td>
<td>7.96</td>
<td>6.74</td>
</tr>
<tr>
<td>47</td>
<td>Ignore substantial risks of the expected findings for society or envir..</td>
<td>7.94</td>
<td>6.61</td>
</tr>
<tr>
<td>48</td>
<td>Conceal results that contradict your earlier findings or convictions (R)</td>
<td>7.82</td>
<td>6.72</td>
</tr>
<tr>
<td>49</td>
<td>Not share reviewers’ comments with all co-authors (C)</td>
<td>7.71</td>
<td>6.53</td>
</tr>
<tr>
<td>50</td>
<td>Ignore substantial safety risks of the study to participants, workers ..</td>
<td>7.48</td>
<td>6.11</td>
</tr>
<tr>
<td>51</td>
<td>Refuse to respond to an allegation of a breach of research integrity (C)</td>
<td>7.42</td>
<td>6.19</td>
</tr>
<tr>
<td>52</td>
<td>Stop data collection earlier than planned because the results are aire..</td>
<td>7.40</td>
<td>6.23</td>
</tr>
<tr>
<td>53</td>
<td>Modify the results or conclusions of a study due to pressure of a spon..</td>
<td>7.22</td>
<td>5.94</td>
</tr>
<tr>
<td>54</td>
<td>Failure to disclose a sponsor of the study (R)</td>
<td>7.12</td>
<td>6.06</td>
</tr>
<tr>
<td>55</td>
<td>Communicate results to the general public before a peer reviewed publi..</td>
<td>7.06</td>
<td>5.80</td>
</tr>
<tr>
<td>56</td>
<td>Selectively delete data, modify data or add fabricated data after perf..</td>
<td>7.02</td>
<td>5.90</td>
</tr>
<tr>
<td>57</td>
<td>Present grossly misleading information in a grant application (C)</td>
<td>6.81</td>
<td>5.94</td>
</tr>
<tr>
<td>58</td>
<td>Demand, accept or offer substantial gifts for doing a favor (C)</td>
<td>6.42</td>
<td>5.24</td>
</tr>
<tr>
<td>59</td>
<td>Fabricate data (D)</td>
<td>6.40</td>
<td>5.46</td>
</tr>
<tr>
<td>60</td>
<td>Review your own papers (C)</td>
<td>6.32</td>
<td>5.06</td>
</tr>
</tbody>
</table>

Additional file 4.8: Ranking according to priority for RCR
<table>
<thead>
<tr>
<th>Rank</th>
<th>Research Misbehavior</th>
<th>priority for RCR (mean)</th>
<th>Lower 95% confidence limit</th>
<th>Upper 95% confidence limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Fabricate data (D)</td>
<td>4.53</td>
<td>4.32</td>
<td>4.74</td>
</tr>
<tr>
<td>2</td>
<td>Selectively delete data, modify data or add fabricated data after perf.</td>
<td>4.41</td>
<td>4.23</td>
<td>4.60</td>
</tr>
<tr>
<td>3</td>
<td>Turn a blind eye to putative breaches of research integrity by others ..</td>
<td>4.12</td>
<td>3.91</td>
<td>4.33</td>
</tr>
<tr>
<td>4</td>
<td>Ignore substantial safety risks of the study to participants, workers ...</td>
<td>4.03</td>
<td>3.87</td>
<td>4.19</td>
</tr>
<tr>
<td>5</td>
<td>Modify the results or conclusions of a study due to pressure of a spon.</td>
<td>4.02</td>
<td>3.73</td>
<td>4.32</td>
</tr>
<tr>
<td>6</td>
<td>Ignore basic principles of quality assurance (D)</td>
<td>4.02</td>
<td>3.81</td>
<td>4.24</td>
</tr>
<tr>
<td>7</td>
<td>Insufficiently supervise or mentor junior coworkers (C)</td>
<td>3.96</td>
<td>3.76</td>
<td>4.16</td>
</tr>
<tr>
<td>8</td>
<td>Ignore substantial risks of the expected findings for society or envir...</td>
<td>3.92</td>
<td>3.56</td>
<td>4.28</td>
</tr>
<tr>
<td>9</td>
<td>Not report all study protocol-stipulated results (R)</td>
<td>3.91</td>
<td>3.64</td>
<td>4.19</td>
</tr>
<tr>
<td>10</td>
<td>Conceal results that contradict your earlier findings or convictions (R)</td>
<td>3.89</td>
<td>3.63</td>
<td>4.16</td>
</tr>
<tr>
<td>11</td>
<td>Refuse to respond to an allegation of a breach of research integrity (C)</td>
<td>3.89</td>
<td>3.64</td>
<td>4.14</td>
</tr>
<tr>
<td>12</td>
<td>Delete data before performing data analysis without disclosure (R)</td>
<td>3.88</td>
<td>3.57</td>
<td>4.19</td>
</tr>
<tr>
<td>13</td>
<td>Failure to disclose a relevant financial or intellectual conflict of i..</td>
<td>3.81</td>
<td>3.55</td>
<td>4.07</td>
</tr>
<tr>
<td>14</td>
<td>Present grossly misleading information in a grant application (C)</td>
<td>3.80</td>
<td>3.50</td>
<td>4.09</td>
</tr>
<tr>
<td>15</td>
<td>Not adhere to pertinent laws and regulations (D)</td>
<td>3.78</td>
<td>3.48</td>
<td>4.08</td>
</tr>
<tr>
<td>16</td>
<td>Keep inadequate notes of the research process (D)</td>
<td>3.75</td>
<td>3.46</td>
<td>4.04</td>
</tr>
<tr>
<td>17</td>
<td>Handle existing conflicts of interest inadequately (C)</td>
<td>3.74</td>
<td>3.49</td>
<td>3.99</td>
</tr>
<tr>
<td>18</td>
<td>Choose a clearly inadequate research design or using evidently unsuita..</td>
<td>3.74</td>
<td>3.44</td>
<td>4.04</td>
</tr>
<tr>
<td>19</td>
<td>Take no full responsibility for the integrity of the research project ...</td>
<td>3.73</td>
<td>3.47</td>
<td>3.99</td>
</tr>
<tr>
<td>20</td>
<td>Use published ideas or phrases of others without referencing (R)</td>
<td>3.72</td>
<td>3.47</td>
<td>3.97</td>
</tr>
<tr>
<td>21</td>
<td>Inadequately handle or store data or (bio)materials (D)</td>
<td>3.71</td>
<td>3.43</td>
<td>4.01</td>
</tr>
<tr>
<td>22</td>
<td>Write no or a clearly inadequate research protocol (S)</td>
<td>3.69</td>
<td>3.42</td>
<td>3.96</td>
</tr>
<tr>
<td>23</td>
<td>Not report replication problems (R)</td>
<td>3.68</td>
<td>3.38</td>
<td>3.98</td>
</tr>
<tr>
<td>24</td>
<td>Not publish a valid 'negative' study (R)</td>
<td>3.66</td>
<td>3.33</td>
<td>4.00</td>
</tr>
<tr>
<td>25</td>
<td>Unfairly review papers, grant applications or colleagues applying for ..</td>
<td>3.64</td>
<td>3.33</td>
<td>3.94</td>
</tr>
<tr>
<td>26</td>
<td>Insufficiently report study flaws and limitations (R)</td>
<td>3.64</td>
<td>3.38</td>
<td>3.90</td>
</tr>
<tr>
<td>27</td>
<td>Not report clearly relevant details of study methods (R)</td>
<td>3.61</td>
<td>3.33</td>
<td>3.88</td>
</tr>
<tr>
<td>28</td>
<td>Let your convictions influence the conclusions substantially (R)</td>
<td>3.59</td>
<td>3.31</td>
<td>3.86</td>
</tr>
<tr>
<td>29</td>
<td>Report an incorrect downwardly rounded p-value (R)</td>
<td>3.53</td>
<td>3.25</td>
<td>3.81</td>
</tr>
<tr>
<td>30</td>
<td>Demand or accept an authorship for which one does not qualify (C)</td>
<td>3.53</td>
<td>3.25</td>
<td>3.81</td>
</tr>
<tr>
<td>31</td>
<td>Use unpublished ideas or phrases of others without their permission (C)</td>
<td>3.50</td>
<td>3.22</td>
<td>3.78</td>
</tr>
<tr>
<td>32</td>
<td>Be grossly unfair to your collaborators (C)</td>
<td>3.49</td>
<td>3.25</td>
<td>3.73</td>
</tr>
<tr>
<td>33</td>
<td>Give insufficient attention to the equipment, skills or expertise whic..</td>
<td>3.47</td>
<td>3.22</td>
<td>3.73</td>
</tr>
<tr>
<td>34</td>
<td>Deliberately communicate findings inaccurately in the media or during ...</td>
<td>3.46</td>
<td>3.19</td>
<td>3.75</td>
</tr>
<tr>
<td>35</td>
<td>Report on data-driven hypotheses without disclosure (R)</td>
<td>3.34</td>
<td>3.03</td>
<td>3.65</td>
</tr>
<tr>
<td>36</td>
<td>Importantly change the research design during the study without disclo...</td>
<td>3.34</td>
<td>3.07</td>
<td>3.61</td>
</tr>
<tr>
<td>37</td>
<td>Demand, accept or offer substantial gifts for doing a favor (C)</td>
<td>3.33</td>
<td>3.00</td>
<td>3.66</td>
</tr>
<tr>
<td>38</td>
<td>Re-use of previously published data without disclosure (R)</td>
<td>3.33</td>
<td>3.00</td>
<td>3.66</td>
</tr>
<tr>
<td>39</td>
<td>Failure to disclose a sponsor of the study (R)</td>
<td>3.30</td>
<td>3.01</td>
<td>3.59</td>
</tr>
<tr>
<td>40</td>
<td>Perform data-analyses not stated in the study protocol without disclos...</td>
<td>3.28</td>
<td>2.97</td>
<td>3.59</td>
</tr>
<tr>
<td>41</td>
<td>Review your own papers (C)</td>
<td>3.26</td>
<td>2.80</td>
<td>3.72</td>
</tr>
<tr>
<td>42</td>
<td>Selectively cite to enhance your own findings or convictions (R)</td>
<td>3.25</td>
<td>2.98</td>
<td>3.53</td>
</tr>
<tr>
<td>43</td>
<td>Duplicate publication without disclosure (R)</td>
<td>3.22</td>
<td>2.91</td>
<td>3.53</td>
</tr>
<tr>
<td>44</td>
<td>Refuse sharing data with bona fide colleagues (C)</td>
<td>3.20</td>
<td>2.87</td>
<td>3.51</td>
</tr>
<tr>
<td>45</td>
<td>Omit a contributor who deserves authorship (C)</td>
<td>3.15</td>
<td>2.89</td>
<td>3.41</td>
</tr>
<tr>
<td>46</td>
<td>Add an author who doesn't qualify for authorship (C)</td>
<td>3.15</td>
<td>2.85</td>
<td>3.44</td>
</tr>
<tr>
<td>47</td>
<td>Submit or resubmit a paper or grant application without consent from a...</td>
<td>3.13</td>
<td>2.87</td>
<td>3.40</td>
</tr>
<tr>
<td>48</td>
<td>Not share reviewers' comments with all co-authors (C)</td>
<td>3.13</td>
<td>2.86</td>
<td>3.39</td>
</tr>
<tr>
<td>49</td>
<td>Make no clear distinction between personal views and professional comm..</td>
<td>3.12</td>
<td>2.90</td>
<td>3.33</td>
</tr>
<tr>
<td>50</td>
<td>Selectively cite to please editors, reviewers or colleagues (C)</td>
<td>3.07</td>
<td>2.73</td>
<td>3.41</td>
</tr>
<tr>
<td>51</td>
<td>Selectively cite or cite your own work to improve citation metrics (R)</td>
<td>3.06</td>
<td>2.83</td>
<td>3.28</td>
</tr>
<tr>
<td>52</td>
<td>Report an unexpected finding as having been hypothesized from the star...</td>
<td>3.06</td>
<td>2.66</td>
<td>3.46</td>
</tr>
<tr>
<td>53</td>
<td>Stop data collection earlier than planned because the results are alre...</td>
<td>3.03</td>
<td>2.68</td>
<td>3.37</td>
</tr>
<tr>
<td>54</td>
<td>Collect more data after noticing that the results are almost statistic...</td>
<td>3.00</td>
<td>2.69</td>
<td>3.32</td>
</tr>
<tr>
<td>55</td>
<td>Spread study results over more papers than needed (R)</td>
<td>3.00</td>
<td>2.75</td>
<td>3.25</td>
</tr>
<tr>
<td>56</td>
<td>Propose study questions which are clearly irrelevant (S)</td>
<td>2.95</td>
<td>2.60</td>
<td>3.29</td>
</tr>
<tr>
<td>57</td>
<td>Re-use parts of your own publications without referencing (R)</td>
<td>2.94</td>
<td>2.63</td>
<td>3.25</td>
</tr>
<tr>
<td>58</td>
<td>Not acknowledge contributors who do not qualify for authorship (C)</td>
<td>2.87</td>
<td>2.55</td>
<td>3.19</td>
</tr>
<tr>
<td>59</td>
<td>Communicate results to the general public before a peer reviewed public...</td>
<td>2.67</td>
<td>2.28</td>
<td>3.06</td>
</tr>
<tr>
<td>60</td>
<td>Not ask permission by contributors for the wording of the acknowledgm..</td>
<td>2.47</td>
<td>2.19</td>
<td>2.76</td>
</tr>
</tbody>
</table>