Statistical summary of the change in MOH measures between the start of each Woodlands Trust one-day educational seminar *or* group therapy course and the 3-month follow-up [2004 to 2017 period] (for those gambler clients who provided 3-month follow-up data)

Dave Saville
Principal Biometrician
Saville Statistical Consulting Limited
P O Box 69192, Lincoln 7640
Email: savillestat@gmail.com; Phone: 64-3-345 5799

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Executive summary

There were 858 clients who attended either a Woodlands Trust one-day educational seminar or a group therapy course in the period 2004 to 2017 and who provided both initial and 3-month follow-up data for two Ministry of Health (MOH) measures ("control over gambling" and "$ lost"). This report summarises the change in each MOH measure between the initial and 3-month assessments for these 858 clients.

Overall, 86% of these clients showed an improvement in one or both of the MOH measures between the start of the seminar or course and the 3-month follow-up.

- 82% of responding clients reduced their "$ lost" between the start of the seminar or course and the 3-month follow-up.

- The average reduction in the "$ lost" measure was 70%, with the average $ lost reducing from $994 to $299.

- 58% of responding clients improved their "control over gambling" between the start of the seminar or course and the 3-month follow-up.

- The average improvement in the "control over gambling" measure was 55% of the maximum improvement that could be achieved (down to a score of 1).

- At the initial assessment, 45% of clients were "out of control", while at the 3-month follow-up assessment only 11% of clients were "out of control".

In general, those clients with the worst MOH measures showed the most improvement in the measures between the initial assessment and the 3-month follow-up assessment. For more information on this aspect of the data, go to sections 5 and 6 of the report below.

METHOD

Since the Woodlands Trust courses and seminars commenced, data has become available for 858 gambler clients who completed both initial and 3-month follow-up questionnaires.

For these gambler clients, the change in each MOH measure ($ lost and control over gambling) between the initial assessment and the 3-month assessment is now summarised in several ways, as follows:

1. The changes in measures between the initial and 3-month assessments are classified into "reductions" (good), no change, and increases (not good), and counted.

2. The number of measures showing a reduction (0, 1 or 2) is tabulated.

3. The 95% Confidence Interval (95% CI) is calculated for the mean reduction in each measure between the initial and 3-month assessments (averaged over all gambler clients who responded on both occasions).

4. The second measure, "control over gambling" initially had four categories as follows:
1	Completely in control
2	Mostly in control
3	Mostly out of control
4	Completely out of control

This was later changed to:
1	Complete control
2	Some control
3	Little control
4	No control

In this report, the more recent wording is used.

For this measure, the number of clients in each category at the start of the seminars and courses is calculated, and compared to the number of clients in each category at the 3-month assessment.

5. Also for this measure, the fate of each client is tracked more precisely by calculating the number of clients who change from, e.g., "little control" to "some control".

6. For each client, the reduction in each measure is plotted against the initial measure, and a line of best fit put through the data (this line is restricted to pass through the origin, or the point (1,0) in the case of the Control measure, for which 1=complete control).

RESULTS

1. The changes in each MOH measure between the initial and 3-month assessments are classified into "reductions" (good), no change, and increases (not good), and counted. The percentage of clients who reduced their measure is also given.

	Value	$ lost	Control
Measure increased	Not good	91	62
Zero change	Neutral	67	297
Measure reduced	Good	700	499
TOTAL		**858**	**858**
% reducing	**Good**	**82%**	**58%**

Overall, 82% improved their $ lost measure and 58% improved their control over gambling measure.

2. The number of clients **who showed a reduction in one or both of the MOH measures** was 738 (or **86%**). More precisely, 120 clients did not show a reduction in either measure, 277 clients showed a reduction in just one measure, and 461 clients showed a reduction in both measures.

3. For each MOH measure, the mean initial value, the mean 3-month value, and the 95% confidence interval (95% CI) for the mean reduction in measure between the initial and 3-month assessments (averaged over all clients) are as follows:

	$ lost	Control
Mean initial measure	994	2.4
Mean final measure	299	1.6
Mean reduction in measure	**695**	**0.8**
95% confidence interval for mean reduction in measure	**±141**	**±0.1**

Summary: On average, both MOH measures reduced between the initial and 3-month assessments, when averaged over all gambler clients; this reduction was statistically significant for both measures at $p<0.001$. On average, the dollars lost measure reduced by 70% and the Control measure reduced by 55% of the maximum possible reduction (to a score of 1).

4. For the "control over gambling" measure, the number of clients in each category for the initial assessment was calculated, and compared to the number of clients in each category at the 3-month assessment.   Results are:

	Initial	*3-month*
Complete control	150	417
Some control	321	349
Little control	242	63
No control	145	29

At the initial assessment, 45% of clients were "out of control" (categories 3 or 4), while at the 3-month assessment, only 11% of clients were "out of control".

5. The fate of each client is now tracked more precisely by calculating the number of clients who change categories for the "Control over gambling" measure. Results are:

		3-month Control category			
		Complete	Some	Little	No
Initial	Complete	**116**	28	3	3
Control	Some	161	**142**	15	3
category	Little	80	126	**26**	10
	No	60	53	19	**13**

To interpret this table, note that:
- clients who lie on the main diagonal (**bold**ed) represent "no change in category" (116 + 142 + 26 + 13 = 297 clients)
- clients who lie on the diagonal immediately *below* the main diagonal had "improved by one category" (161 + 126 + 19 = 306 clients)
- clients who lie on the diagonal *two below* the main diagonal had "improved by two categories" (80 + 53 = 133 clients)
- clients in the bottom left cell of the table had "improved by three categories" (60 clients)
- clients who lie on the diagonal immediately *above* the main diagonal had "deteriorated by one category" (28 + 15 + 10 = 53 clients)
- clients who lie on the diagonal *two above* the main diagonal had "deteriorated by two categories" (3 + 3 = 6 clients)
- clients in the top right cell of the table had "deteriorated by three categories" (3 clients)

6.   **(a) $ lost**

For $ lost, the reduction in $ lost is plotted against the initial $ lost for all 858 clients, and a "line of best fit" plotted through the data (solid line). This line is restricted to pass through the origin.
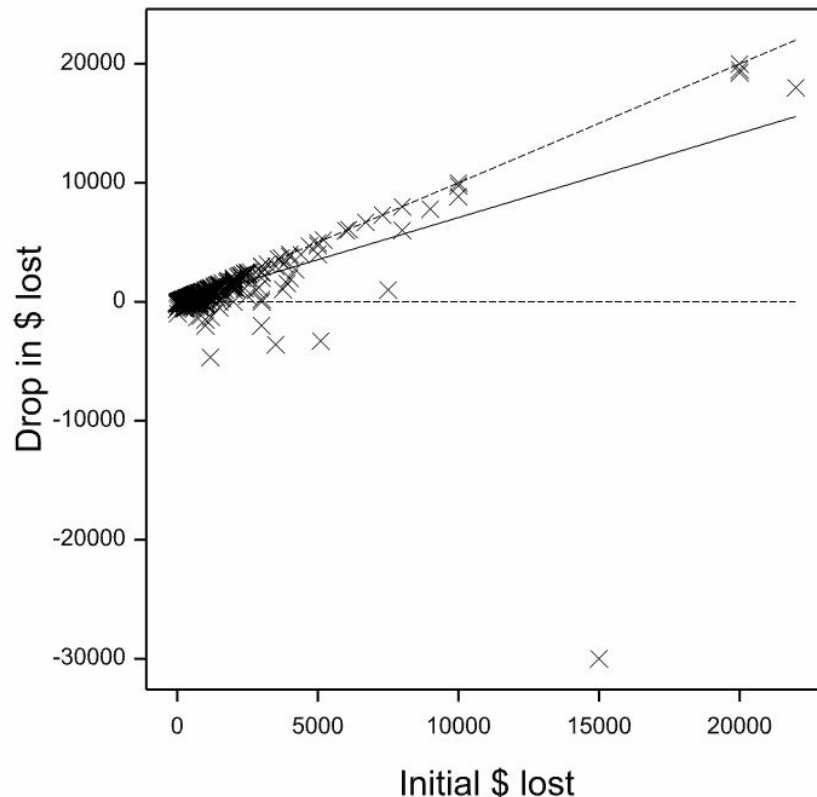
In words, those clients with the highest initial $ lost had the most potential for reduction, and the *solid line* on the graph shows that on average they did reduce more than clients with low initial $ lost.

To further interpret this graph, the upper dashed line indicates the *maximum improvement* that a client can achieve, given their initial $ lost. For example, a client with an initial $ lost of $500 can only improve by a maximum of $500 (down to 0), while a client with an initial $ lost of $5,000 can improve by a maximum of $5,000 (down to 0). [There are no bounds on how much a client can *deteriorate*, so no lower dashed line is given.]

The *horizontal* dashed line at "y=change in $ lost=0" is the boundary between clients who improved in the $ lost measure during the seminar or course (and the ensuing 3-month period) and those who deteriorated in the $ lost measure. As tabulated in section 1 above, there were 67 clients on this line of no change, 700 clients who improved (these are above the line y=0), and 91 clients whose $ lost values deteriorated, including one with a $30,000 deterioration (these are below the line y=0).

Note that if the seminars and courses had been totally *ineffective*, the above graph would be a "<" shape centred on the horizontal line y=0, since positive and negative changes in $ lost would be roughly equal in number. If the seminars and courses had a positive effect for *all* clients, then all points would be above the line y=0 (i.e., all $ lost measures reduce, with no increases in $ lost measure). In the graph shown above, most points are above the line y=0, reflecting the fact that the $ lost measure improved for 82% of clients who responded at the 3-month follow-up assessment.

In the extreme hypothetical case that all 3-month $ lost values are zero (seminars and courses were *100% effective* for all clients), then all of the points would lie on the 1:1 line though the origin (upper dashed line with slope=1). To get an estimate of the percentage effectiveness (as an average over the clients), the line of best fit was constrained so that it passed through the origin. The estimated slope of the line was 0.708, suggesting that the *percentage effectiveness* of the seminars and courses in terms of reducing $ lost was 70.8%.

Details of fitted regression line shown on graph
- The *equation* of the fitted line is:
(Reduction in $ lost) = 0.708 x (Initial $ lost)
- The slope of this line is significantly different from zero at the 0.1% level of statistical significance.

(b) Control score

For the Control score, the reduction in score is plotted against the initial score for all 858 clients who responded at the 3-month follow-up, and a "line of best fit" plotted through the data (solid line). This line is restricted to pass through the point (1,0), since an initial score of 1 is as low as the scale goes. (Note that to make the 858 points more visible on the graph, a small amount of random noise has been added to each of the x and y values. If this had not been done, there would be only 16 points showing on the graph, with an unknown number of repetitions of each point.)
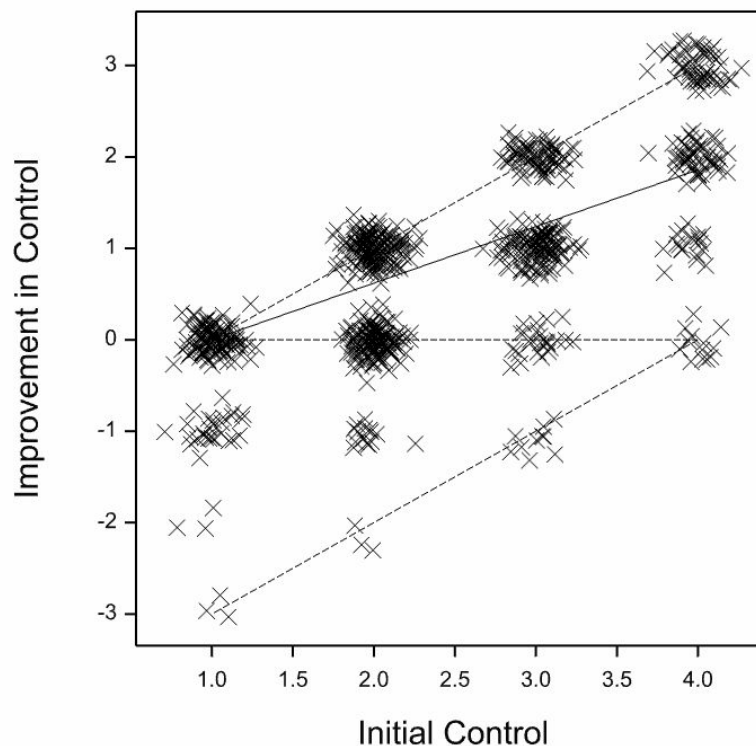
In words, those clients with the highest initial Control scores had the most potential for reduction, and the *solid line* on the graph shows that on average they did reduce more than clients with low initial Control scores.

To further interpret this graph, the upper and lower dashed lines indicate the bounds for the data. The *upper line* indicates the *maximum improvement* that a client can achieve, given their initial Control score. For example, a client with an initial score of 2 can only improve by a maximum of 1 unit (down to 1), while a client with an initial score of 4 can improve by a maximum of 3 units (down to 1).

The *lower line* indicates the maximum amount by which a client's score can *deteriorate*, given their initial Control score. Control scores must lie within the range 1 (perfect) to 4 (worst possible), so the maximum deterioration for a client with an initial Control score of "b" is (4-b). For example, a client with an initial Control score of 2 can deteriorate by a maximum of (4-2) = 2 units (up to 4), while a client with an

initial Control score of 3 can only deteriorate by a maximum of (4-3) = 1 unit (up to 4).

The *horizontal* dashed line at "y=change in Control=0" is the boundary between clients who improved in Control score during the seminar or course (and the ensuing 3-month period) and those who deteriorated in Control score. As tabulated in section 1 above, there are 297 clients on this line of no change, 499 clients whose scores improved (these are above the line y=0), and 62 clients whose score deteriorated (seen below the line y=0).

Note that if the seminars and courses had been totally *ineffective*, positive and negative changes in score would be roughly equal in number. If the seminars and courses had a positive effect for *all* clients, then all points would be above the line y=0 (i.e., all scores reduce, with no increases in score). In the graph shown above, over half of the points are above the line y=0, reflecting the fact that the Control score improved for 58% of clients.

In the extreme hypothetical case that all final Control scores are 1 (seminars and courses were *100% effective* for all clients), then all of the points would lie on the 1:1 line though the point (1,0) (upper dashed line with slope=1). To get an estimate of the percentage effectiveness (as an average over the clients), the line of best fit was constrained so that it passed through the point (1,0). The estimated slope of the line was 0.620, suggesting that the *percentage effectiveness* of the seminars and courses in terms of reducing the Control score was 62.0%.

Details of fitted regression line shown on graph
- The *equation* of the fitted line is:

(Reduction in Control score) = 0.620 x (Initial Control score - 1)
- The slope of this line is significantly different from zero at the 0.1% level of statistical significance.