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Reasons for homeostatic failure in subjective wellbeing

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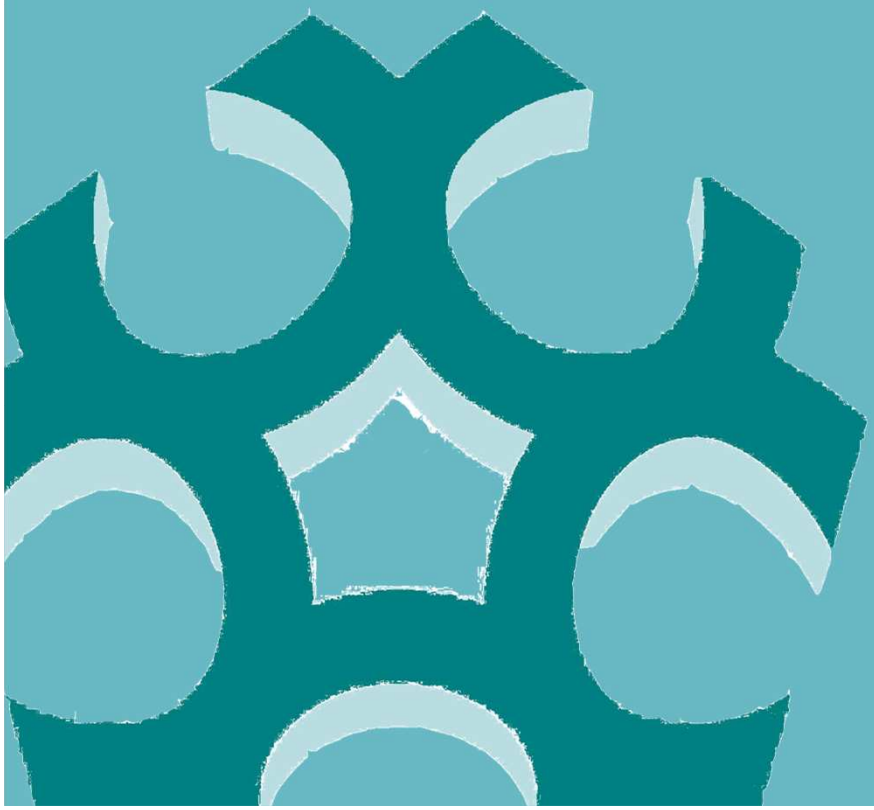

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The microdata do not contain any information that enables identification of the individuals or families to which they refer.

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ABSTRACT

This paper presents initial results from work being done on the reasons that people experience homeostatic defeat in subjective wellbeing. Subjective wellbeing shows signs of homeostasis, meaning it always gravitates to one number (on average 75 on a scale of 1 to 100). The range around this average is also very small, suggesting that homeostasis is acting as a protective factor for wellbeing.

Homeostatic defeat is when homeostasis stops operating as a protective factor in subjective wellbeing. Homeostatic defeat occurs after challenges to subjective wellbeing become too much for the homeostatic system to deal with.

This paper derives a point of homeostatic failure using data from the HILDA survey, and then identifies the group of people who have experienced homeostatic failure from one wave to the next of HILDA. Changes in social capital and life events experienced by these people over these two waves are calculated. A logistic regression model is then used to identify which of these changes have a significant effect on homeostatic failure.

We find that, after controlling for changes in social capital and health, only two major life events (birth of a child and separation) have an effect on homeostatic failure. The birth of a child is associated with a lower probability of homeostatic failure; and separation is associated with a higher probability. Worsening of health and a reduction in leisure time are also associated with a higher probability of homeostatic failure. Income was significantly associated with a lower probability of homeostatic failure, so it is a protective factor.

1 INTRODUCTION

The concept of wellbeing is now firmly entrenched in the international literature. Measures of wellbeing go beyond using economic indicators, and include domains like community vitality, governance, psychological wellbeing, health, education, and many others. A recent review of the wellbeing literature has been published in Mohanty and Tanton (2012).

A number of countries now have measures of wellbeing. These countries include Bhutan (The Centre for Bhutan Studies, 2012); Australia (ABS, 2010; Cummins, 2002); the OECD (OECD, 2012) and many more. All these measures go beyond the concept of just considering economic measures of growth like GDP, and include measures like health, education, social networks, etc.

One of the main proponents in recent years of using measures beyond economic growth to measure progress has been the Commission on the Measurement of Economic Performance and Social Progress, which was formed by the French government to:

"identify the limits of GDP as an indicator of economic performance and social progress, including the problems with its measurement; to consider what additional information might be required for the production of more relevant indicators of social progress; to assess the feasibility of alternative measurement tools, and to discuss how to present the statistical information in an appropriate way." (Stiglitz et al, 2009, p. 1)

The members of this commission included Josef Stiglitz, Amartya Sen and Jean-Paul Fitoussi. There were a number of recommendations from this report, but the main one that affects this paper is Recommendation 6:

"Recommendation 6: Quality of life depends on people's objective conditions and capabilities. Steps should be taken to improve measures of people's health, education, personal activities and environmental conditions. In particular, substantial effort should be devoted to developing and implementing robust, reliable measures of social connections, political voice, and insecurity that can be shown to predict life satisfaction." (Stiglitz et al, 2009, p. 15)

This focus on wellbeing and life satisfaction for countries is an extension of psychological research on wellbeing and life satisfaction for individuals. This psychological research uses measures of subjective wellbeing, so a question is asked of an individual and they answer based on a scale. The question asked in the Household Income and Labour Dynamics Survey of Australia (HILDA), an annual longitudinal study run by the Melbourne Institute, is:

"All things considered, how satisfied are you with your life?"

with a rating of 0 to 10. The other survey that asks questions on subjective wellbeing is the Australian Unity Quality of Life Survey, run by Bob Cummins of Deakin University for Australian Unity. This survey has been run 26 times since 2001, and is currently run about twice a year, with the latest one being Survey 26 from September 2011. The question asked in the Australian Quality of Life survey is:

"Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole? (0 completely unsatisfied 1 2 3 4 5 neither unsatisfied nor satisfied 6 7 8 9 10 completely satisfied)"

In both HILDA and AQOL, additional questions ask about the respondents satisfaction with a number of other areas of life, and these include home, employment opportunities, financial situation, safety, health, neighbourhood, free time and personal relationships. In the Quality of Life survey, another dimension on spirituality is added (so how satisfied are you with your spirituality), making ten dimensions. All these dimensions can be ranked from 0 to 10. In both surveys, the results for all dimensions can then be summed to get a total score out of 90 (HILDA) or 100 (AQOL). So there are two measures of wellbeing in each survey; a measure of overall wellbeing which is ranked from 0 to 10, and a summary measure of wellbeing for a number of different dimensions in life that can range from 0 to 90 (HILDA) or 0 to 100 (AQOL),

Some international surveys on subjective wellbeing ask respondents to rank how satisfied they are with their life on a scale of 1 to 100 rather than 0 to 10. In this paper, as we use all Australian data, our wellbeing indicators are shown on a scale of 0 to 10,

Some of the research on individual wellbeing is about the stability of subjective measures of wellbeing. Any survey (Australian or International) on subjective wellbeing will give similar results, as shown by Cummins (1995, 1998). These studies show a mean of 7.5 out of 10 75 out of 100) for subjective wellbeing for Western countries and 7.0 out of 10 (70 out of 100) for non-Western countries, with consistent results across different countries.

Other research has been about the stability, or the 'homeostasis' of subjective wellbeing over time (see Cummins, 2009). This research, using Australian data, suggests that subjective wellbeing is very stable – it tends to hold within a narrow range of values. Further, subjective wellbeing is homeostatic. This means a number of things, but the main thing it means for this paper is that there is a threshold value which, as this value is approached, the person tries to retain control. If this threshold is breached, the person will, over time, regain control and subjective well being will return to it's normal value for that person. So homeostasis is operating as a protective factor for wellbeing, tending the person back to their "normal" level of wellbeing.

In this paper, we have used what Cummins calls "homeostatic defeat" (see Cummins, 2003, p. 253 and Cummins, 2009) and looked at what factors can influence a person suffering homeostatic defeat. Homeostatic defeat is when homeostasis stops operating as a protective factor in subjective wellbeing, and occurs after challenges to subjective wellbeing become too much for the homeostatic system to deal with. These may be some major life events, but could also be other factors that have been shown to have an effect on subjective wellbeing, like health (see Berry, 2009).

This paper shows initial work in this area, and there are many things that still need to be done. We are interested in any comments on the analysis and results from this work.

Section 2 outlines the literature on homeostatic defeat, and identifies where this point may occur by looking at the distribution of wellbeing.

Section 3 looks at the data, and how the different factors have been estimated, including which major life events are associated with homeostatic defeat. Section 4 describes the regression analysis which was done. Section 5 provides a short discussion of the results, and Section 6 outlines future directions of this research, including extending wellbeing to communities, and an analysis of identifying tipping points (see Schelling, 1969; 1972) in community wellbeing – so at what level of wellbeing at a community level will the community 'tip' and become unsustainable. The final section provides some conclusions.

2 WHERE IS THE POINT OF FAILURE IN HOMEOSTASIS OF WELLBEING?

Recent papers by Cummins using the Australian Unity Wellbeing data have identified that subjective wellbeing is very stable. Over a period of 9 years, on a scale of 0 to 10, the subjective wellbeing score had a mean of 7.49 and a standard deviation, once weighted to the whole population, of 1.24. This means that 95% of people in Australia have a value between 5.02 and 9.96 (Cummins, 2009).

Looking at another survey which has a measure of wellbeing, the Household Income Labour Dynamics of Australia (HILDA) survey, the distribution of the Wellbeing question in nine waves of the HILDA survey was looked at. The cumulative distribution, mean and standard deviation over these nine waves, and the average across all the waves, is shown in Table 1.

It can be seen that the mean is very similar to the mean of subjective wellbeing from the Australian Unity Wellbeing Survey – about 7.9, compared to about 7.5 for the Australian Unity Wellbeing Survey. The standard deviation is also similar with an average of 1.48 across all waves, compared to 1.24 for the Australian Unity Wellbeing Survey.

Looking at the cumulative frequency distribution, there are very few people with happiness below 3 (on average only 1.55 per cent of the Australian population), but 65 per cent of the population have a value of 7 or above. On average, 15 per cent of the population have a value of 10.

The other point to make about Table 1 is the consistency of the indicator over time. When looking at the distribution, there is not much change in it over the nine waves of HILDA. In Waves 8 and 9, there seem to be slightly fewer people rating wellbeing as 0, and a few more people in Wave 8 and 9 rating their wellbeing as 10 compared to Waves 1 and 2, but the general picture of wellbeing across all the surveys is consistent.

Table 1 HILDA wellbeing cumulative distribution, all 9 waves

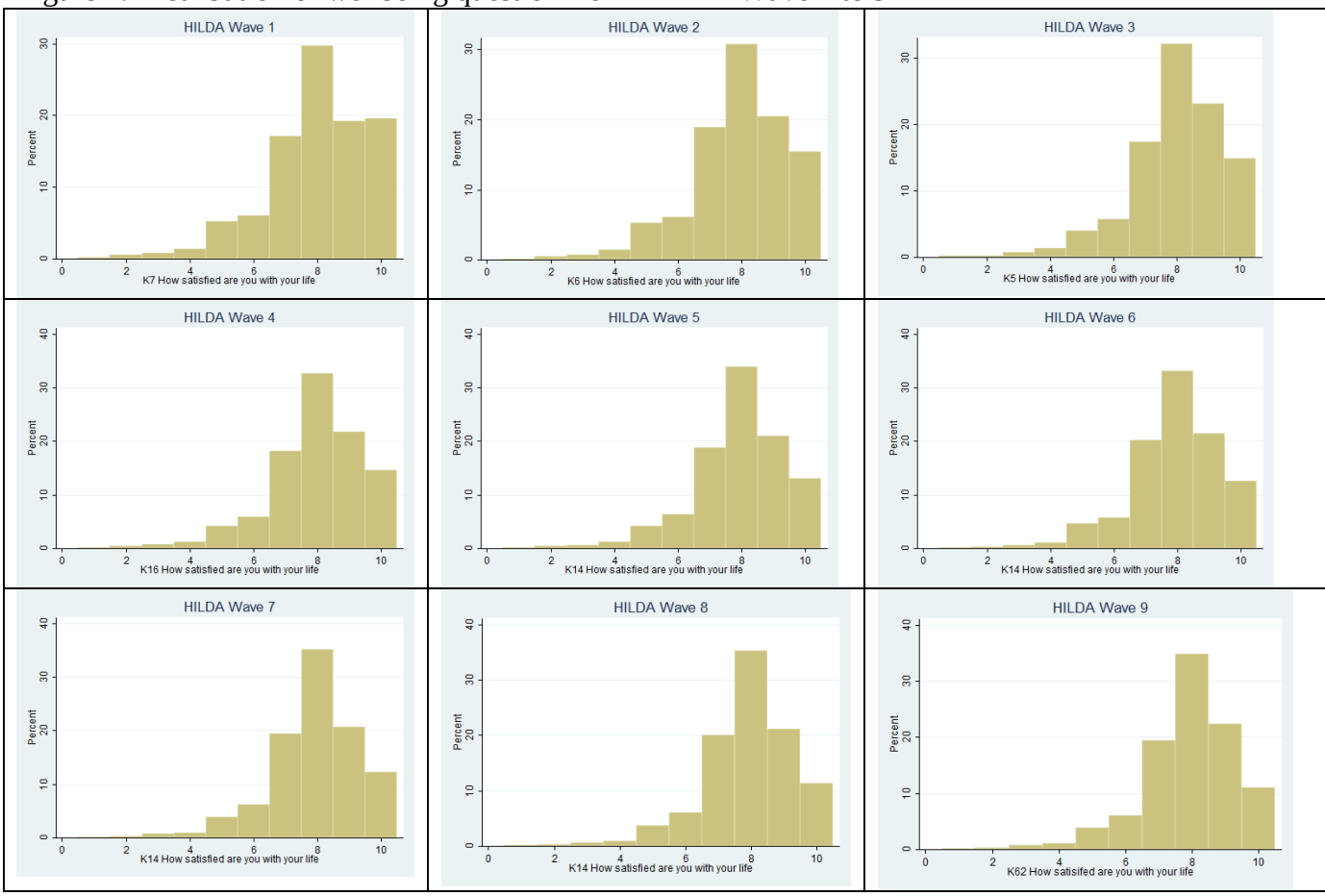
	HILDA Wave									
Wellbeing	1	2	3	4	5	6	7	8	9	Average
0	0.28	0.17	0.23	0.14	0.10	0.17	0.15	0.04	0.05	0.15
1	0.49	0.36	0.43	0.27	0.25	0.37	0.34	0.18	0.40	0.34
2	1.04	0.90	0.76	0.78	0.71	0.70	0.73	0.69	0.86	0.80
3	1.92	1.71	1.60	1.60	1.41	1.37	1.47	1.29	1.58	1.55
4	3.35	3.24	3.12	2.83	2.55	2.65	2.46	2.19	2.61	2.78
5	8.71	8.81	7.21	7.26	7.16	7.75	6.91	6.17	6.86	7.43
6	14.81	15.10	13.12	13.40	13.67	13.77	13.38	12.57	13.63	13.72
7	32.10	34.58	30.73	31.97	32.88	33.87	33.28	33.10	33.18	32.85
8	61.62	64.98	62.32	63.94	66.15	66.82	67.92	67.70	67.77	65.47
9	80.55	84.60	84.85	85.29	87.11	87.66	88.19	88.70	89.22	86.24
10	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Mean	7.95	7.86	7.96	7.93	7.88	7.85	7.85	7.87	7.84	7.89
Std Dev	1.67	1.61	1.56	1.54	1.50	1.51	1.48	1.43	1.48	1.53

These frequency distributions were then graphed, and are shown in Figure 1. It can be seen from these graphs that the mode (the value with the greatest density) is 8 across all waves of the survey. It appears that in the HILDA survey, the majority of values lie in the range of 7 – 10, and this is confirmed by Table 1. Below 7, there seems to be a sudden drop off in the number of people experiencing wellbeing between 1 and 6.

Looking at the graphs in Figure 1, and the figures in Table 1, it seems that there is a failure in homeostasis when wellbeing is at about 7. The majority of people in Australia have a level above 7 (on average 67 per cent of people in Australia have wellbeing above 7). From the graphs in Figure 1, there appears to be a sudden drop in the proportion of people with a wellbeing of 6 compared to a wellbeing of 7. This suggests that the set point for the operation of homeostasis is at 7, and that below this level there has been a failure in homeostasis.

The reason for this is because for most of their lives, people actively maintain their wellbeing at a level of 7 or above. As the level of life satisfaction falls below 7, this changes (see Cummins, 2003), and homeostasis appears to fail. Testing by Cummins using the Australian Unity Wellbeing data identified a resistance line at a wellbeing level of 7 (see Cummins, 2003).

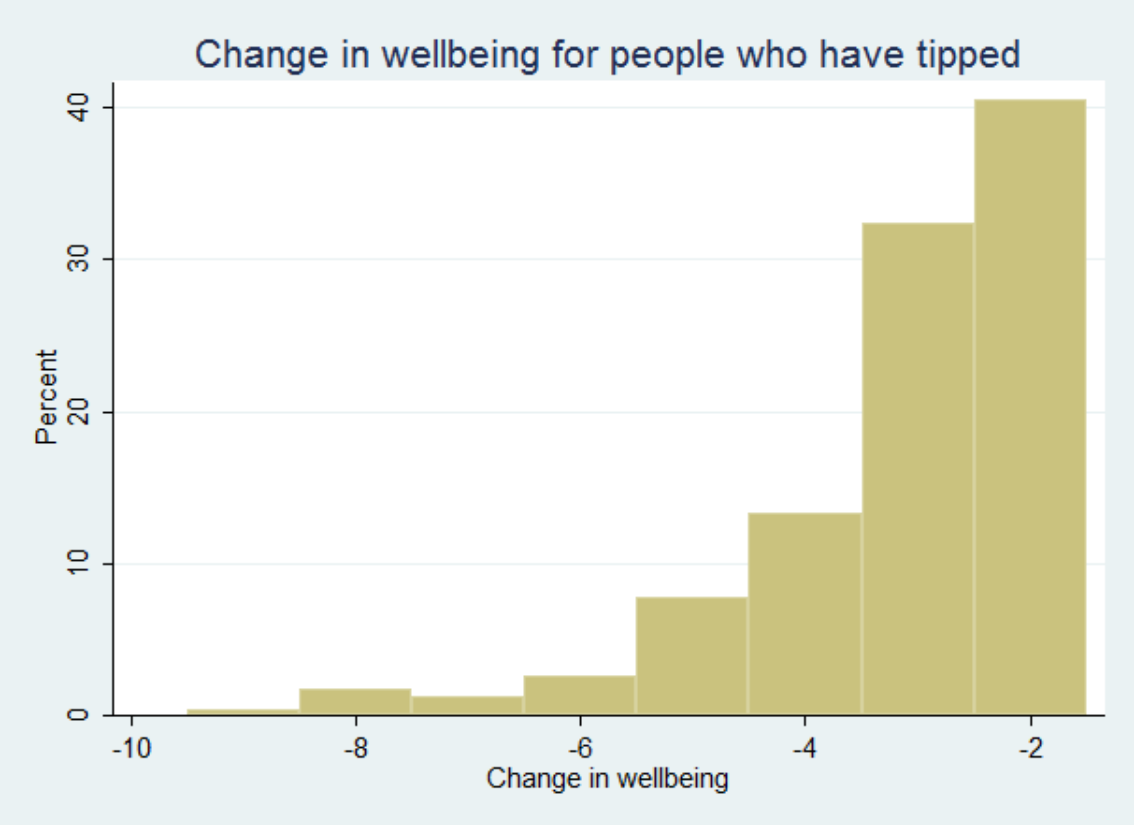
Figure 1: Distribution of wellbeing question from HILDA Wave 1 to 9



We then looked at how far wellbeing changed when homeostatic failure occurred. Because we used HILDA for this analysis, the longitudinal data allowed us to look at how far people fell from one year to the next. We used the change from wellbeing between Wave 8 and Wave 9, and only looked at people who went from above 7 to below 7 on the HILDA scale. Figure 2 shoes the frequency distribution of how far each person that experienced this homeostatic failure fell in terms of their wellbeing. Because we were looking at people going from above 7 to below 7, the minimum change is 2.

It can be seen that the majority of people experienced a change of 2 or 3 points in wellbeing – nearly 75% of people who experienced homeostatic failure fell by 2 or 3 points in wellbeing. The extent of the drop falls significantly after this, with only about 14% of people experiencing a drop of 4 points in wellbeing.

Figure 2: Extent of homeostatic failure



Having identified a level of 7 in the HILDA data for homeostatic failure, the next step was to identify what contributes to this homeostatic failure. This is the topic of Section 4. The next section shows the data used in this analysis.

3 THE DATA

To analyse what contributes to a person suffering homeostatic defeat in subjective wellbeing, we have estimated a logistic regression model using two waves of Household Income and Labour Dynamics of Australia (HILDA): wave 8 (2008) and wave 9 (2009). Focusing on the analysis in the preceding section that identifies a value of 7 in the HILDA data for homeostatic failure, the dependent variable in this model is constructed using the overall life satisfaction variable from the HILDA survey. This variable uses the question 'how satisfied the person is in his/her life?'. This variable is based on individual level responses on a Kessler scale (K10) of 0 to 10, where 0 represents the person is totally dissatisfied with life and 10 represents the person is totally satisfied with life. So, the dependent variable identifies individuals whose personal overall wellbeing (how satisfied he/she is with life) has dropped from above 7 in HILDA Wave 8 to below 7 in HILDA Wave 9.

The analysis uses a range of individual and household level characteristics (including equivalised disposable household income) that may contribute to a person's homeostatic failure in subjective wellbeing. The variables used in this analysis include a set of major life events from wave 9 of the HILDA survey, variables representing the change in social capital status of the individual between wave 8 and wave 9, a variable

representing a variation in leisure time available to the person between the two waves, a variable representing the worsening physical functioning status of the person (SF 36 scale) in wave 9 compared to wave 8, a variable representing the worsening general health status of the person (SF 36 scale) in wave 9 compared to wave 8, a variable representing the worsening general household health status of the household in wave 9 compared to wave 8, and a variable representing the worsening employment status of the household in wave 9 compared to wave 8.

The set of major life event variables that are included in this model from HILDA wave 9, including the number of valid observations for each major life event, the proportion experiencing this major life event in the sample and the standard error are shown in Table 2.

It can be seen that some serious major life events experienced very low numbers in HILDA (for example, only 63 families experienced a death of a child or a spouse in the last year), and the standard errors around these numbers are high.
In an effort to capture whether experiencing more than one major life event in the previous year would be a significant contributing factor to homeostatic failure in subjective wellbeing rather than each of them individually, we also summarized the major life event variables into one variable representing 'number of major life events in the past year'. This was done by counting the number of major life events that came up as significant in a preliminary analysis involving an ordered probit regression for subjective wellbeing and the set of major life event variables only as independent variables from Wave 9 of HILDA survey. The major life events that were significant in this model were then counted for each person to derive a summary of the number of major life events for our model.

Table 2 Major life events from HILDA

Major life event variables	Number of Observations	% (SE)
person got married in the past year	7004	1.3 (0.117)
person got separated from spouse in the past year	6996	2.4 (0.153)
person had birth/adoption of a new child in the past year	6979	2.3 (0.152)
person suffered serious personal injuries/illness in the past year	6977	9.0 (0.287)
death of spouse/child in the past year	6986	0.9 (0.095)
person had death of close relative/family member in the past year	6987	11.1(0.313)
person was a victim of physical abuse in the past year	6985	0.9 (0.096)
person had retired from the workforce in the past year	7000	2.8 (0.166)
person was fired or made redundant in the past year	6987	3.3 (0.179)
person changed job in the past year	6987	9.0 (0.287)
person had a downfall in finance in the past year	6994	4.1 (0.198)
person changed residence in the past year	6997	11.6 (0.320)
1 or more major life events	6961	23.0 (0.470)

Along with this set of major life event variables, we also included changes in other socio demographic and health characteristics that may serve as potential predictors of homeostatic failure in subjective wellbeing. These were used as control variables for health and social capital, both of which we know have an effect on subjective wellbeing. In the literature (Berry et al., 2007) the physical health status of the person and physical functioning are very highly correlated with mental health, and for that reason are expected to be a potential determinant of wellbeing. The OECD (OECD, 2011) also identifies in their surveys in many countries that people consistently put health status together with employment status on the very top of what affects their living conditions. So, better general health status is not only an objective in itself it is also expected to be a potential determinant of subjective wellbeing and homeostatic defeat in subjective wellbeing.

In this paper we have included two variables to capture the influence of change in general health status between wave 8 and 9 on homeostatic defeat in subjective wellbeing. One variable represents the change in household health status and the other one is representing the change in individual health status. A variable representing change in individual physical functioning is also used.
The variables representing change in general health status and change in physical functioning of the person are constructed from HILDA wave 8 and 9, using the SF 36 general health transformed and physical functioning transformed variables. The SF 36 general health transformed is a transformed variable in the HILDA survey recoding and summarizing raw health scores from 10 health related items into a transformed subscale of 0 to 100, with high scores indicating better health. This is also the case with the SF 36 physical functioning transformed variable in HILDA.

In order to describe the change in health status and physical functioning status in our analysis, we have had to calculate cut-points to identify the change from 2008 to 2009. A generally accepted score of less than 60 on these two scales represents poor physical functioning and poor general health (Berry et al. 2010). Correspondingly, the change in general health status of the person in this paper is a binary variable which is 1 if the person has scored greater than 60 in the SF 36 general health transformed variable in wave 8 and has gone down to less than 60 in wave 9. Likewise, the change in physical functioning status of the person in this paper is a binary variable of 1 if the person has scored greater than 60 in SF 36 physical functioning transformed variable in wave 8 and has gone down to less than 60 in wave 9.

The variable representing change in household health status in this model is generated from HILDA wave 9 using the variable representing the health of the person compared to one year ago. The original variable in the HILDA survey is reported on a scale of 1-5, where 1 is much better now than a year ago, 2 is somewhat better now than a year ago, 3 is about the same as one year ago, 4 is somewhat worse now than one year ago and 5 is much worse now than one year ago. In our model the household health status is considered worse than one year ago if in wave 9 the reported response for the person is greater than 3. So, the household health status variable in this model is categorical and constructed at the household level representing 0 if no one in the household suffers from worse health condition compared to one year ago, 1 if one person in the household suffers from worse health condition and 2 if two persons in the household suffer from worse health condition.

The household employment status variable in this model is generated from the HILDA wave 9 individual employment status (ihges). In HILDA the individual employment categories are: 0 less than 15 years old, 1 full time employed, 2 part time employed, 3 not employed but is looking for work, 4 retired, 5 home duties, 6 non-working student and 7 other. Correspondingly, in this model the household employment status variable is a binary variable calculated as a 1 if a household has at least 1 unemployed person and 0 employed people. The change in employment status is calculated as a change from 0 in Wave 8 to a 1 in Wave 9.

Social capital has been emerging as an area of great interest to planners, policy makers and community and welfare organisations around the world as potentially important determinant of wellbeing. This is believed to be powerful enough to offset some of the disadvantages of other forms of capital (Semo, 2011). In the literature social capital has been positively associated with better health, education, productivity and civic participation and also reduced poverty, crime and social exclusion (Putnam, 2000).

However, Social capital is intangible in nature and is a complex and diverse concept to identify and capture its influence on subjective wellbeing. It is mostly realised through interactions between family members, friends, neighbours and formal social relationships and associations such as in educational institutions, clubs and workplaces. These interactions help to develop values such as trust and reciprocity that have the potential to positively influence wellbeing. For the purpose of this research we have conducted factor analysis on a range of variables from HILDA waves 8 and 9 to identify the relationship between social capital and individual wellbeing.

However, it is difficult to then to capture the change in social capital status of an individual between these two waves that would potentially explain the homeostatic defeat in subjective wellbeing. Because of this, we have simplified the concept of social capital somewhat and have used 'change in satisfaction level of the person with the available amount of free time' and the 'change in voluntary work hours of the person' between these two waves. The variable representing the change in satisfaction level of the person with the available amount of free time in this model is constructed using the variable on satisfaction with the amount of free time the person has in both the waves (losatft). These variables are reported on a Kessler 0-10 scale in HILDA, where 0 represents totally dissatisfied, 5 represents neither satisfied nor dissatisfied and 10 represents totally satisfied. So, the change in satisfaction level of the person in this model is a binary variable, where 1 identifies a person's satisfaction level of more than 7 in wave 8 and less than 7 in wave 9 with the available amount of free time. This cutoff was identified by looking at a frequency distribution of this variable.

The change in voluntary work hours (combined hours/minutes per week voluntary charity work) is a binary variable in this model where 1 identifies individuals that have done some positive hours of voluntary work in wave 8 and have done no hours of voluntary work in wave 9.

A list of these variables, how they were derived, and the number of observations, mean and standard error are presented in Table 3.

Table 3 List of other control variables used in the model

Variables	Number of Observations	Mean (SE)
Change in physical functioning (SF36 scale) (Physical functioning is worse in 2009)	6630	0.060(0.238)
Change in general health status (SF36 scale) (Health status is worse in 2009)	7073	0.088(0.284)
Change in leisure time (Satisfied with leisure time in 2008 but dissatisfied with leisure time in 2009)	7696	0.065(0.247)
Change in amount of voluntary work hours (decline in amount of positive voluntary work hours in 2008 to no voluntary work at all in 2009)	6165	0.167(0.373)
Change in household health status – 1, 2 or 3 people in household changed	7721	0.373(0.588)
Change in employment status in the household to at least 1 person unemployed and no-one employed	7721	0.015(0.123)
Equivalised disposable household income in 2009	7721	44.15(30.462)

The next section discusses the econometric analysis to identify which of these factors contribute to homeostatic defeat.

4 WHAT CONTRIBUTES TO HOMEOSTATIC DEFEAT?

This section uses a logistic regression model to identify what variables affect homeostatic failure. The regression model used is a logistic regression model of homeostatic failure, so we use two waves of the HILDA dataset. For this analysis, we have used Wave 8 and Wave 9. The dependent variable is whether an individual has moved from 7 or above in Wave 8 to below 7 in Wave 9. We have called this HF, or Homeostatic Failure.

The independent variables are all variables that may affect whether an individual experiences a reduction in wellbeing. The variables we have used are major life events in HILDA (Married, Separated, Birth, Serious personal injury/illness, serious injury to family member, death of spouse/child, death of other family member, victim of physical abuse, retired from workforce, fired or made redundant, changed residence) and indicators of social capital.

Homeostatic defeat in wellbeing tends to be due to not just one life event, but a number of events happening together. We have therefore converted the life events into a number of life events happening to a particular person from wave 8 to wave 9 of the HILDA survey. This was done by counting the number of major life events that has occurred for each person from Wave 8 to Wave 9 of HILDA. This summarised the life events into one variable.

We may also surmise that some life events are larger than others – so for example, a death in the family may be more significant than losing a job. In future work, we could look at deriving weights for each major life event (possibly from a regression model)

and then use these weights to derive a weighted major life event indicator. Another extension could be to look at life events over the past 2 – 3 years rather than the past year, again weighting them according to their impact on wellbeing.

Literature also suggests that health has a significant impact on wellbeing (see Berry et al, 2010), so we have included change in health status. We have also included some social capital variables, as social capital also has an impact on wellbeing. The social capital variables we have included are change in leisure time, change in voluntary work and change in employment status, as all these variables may be associated with changes in wellbeing (see ABS, 2001; Thoits and Hewitt, 2001).

Cummins (2009) also suggests that money also acts as a protective factor against homeostatic failure. Those with higher incomes can use money to reduce the impact of factors that may be associated with homeostatic defeat, thus protecting themselves to some extent from homeostatic defeat. We have therefore included income in 2009 (so not change in income as we want to incorporate income as a protective factor).

In future work, we will also look to summarise some of these social capital variables into a number of summary factors using factor analysis, similar to the work of Berry et al (2010). The issue we found with this approach was identifying what change in a social capital summary factor from one year to the next was enough to contribute to homeostatic failure. This could be done with a statistical comparison of the changes in the social capital summary factors.

The next step is a logistic regression model of homeostatic defeat with the number of major life events, and change in health and social capital variables from wave 8 to wave 9 to identify which variables have the greatest impact on the likelihood of homeostatic defeat. This model used the replicate weights from HILDA to calculate standard errors and measures of significance.

The results from this model are shown in Table 4.

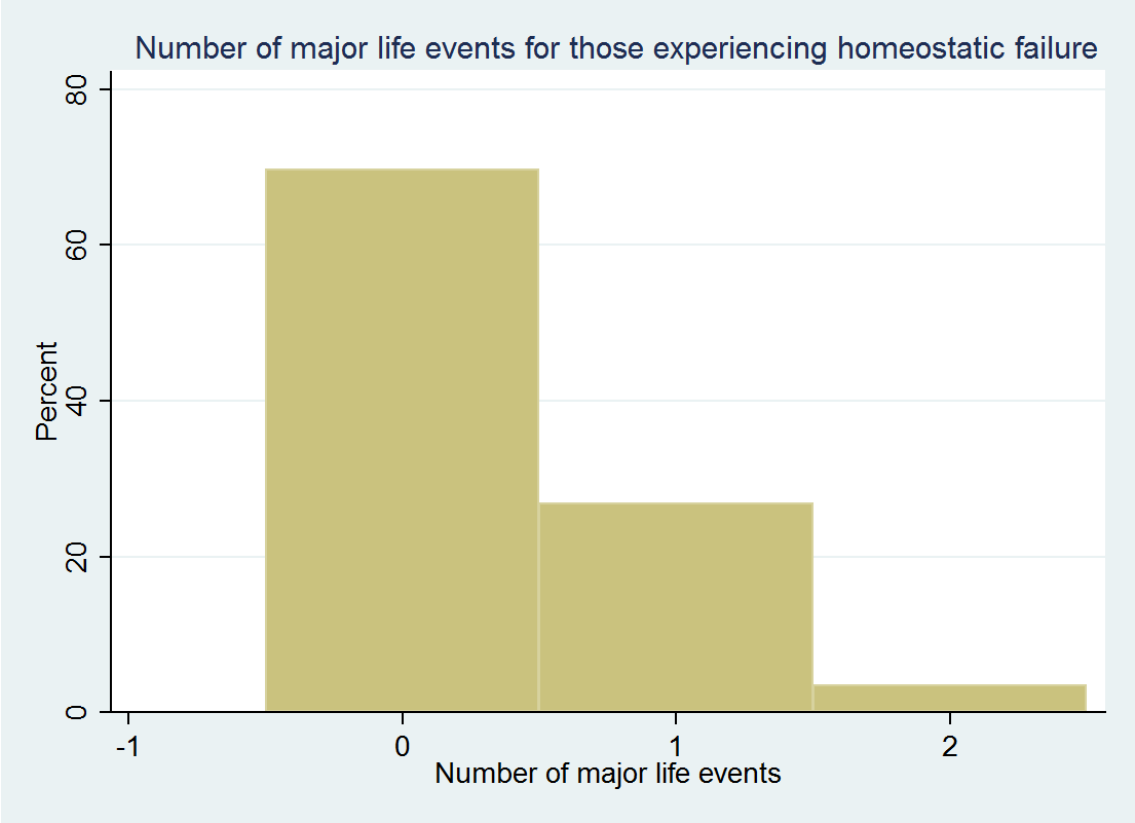
Table 4: Regression of homeostatic defeat, change in health, change in social capital and major life events

Variable	Odds Ratio	P > |t|
Number of major life events in the last year	1.384	0.155
Change in physical functioning (SF36 scale) (Physical functioning is worse in 2009)	0.934	0.850
Change in general health status (SF36 scale) (Health status is worse in 2009)	2.294	0.006
Change in leisure time (Satisfied with leisure time in 2008 but dissatisfied with leisure time in 2009)	3.372	0.000
Change in amount of voluntary work (Satisfied with amount of voluntary work in 2008 but dissatisfied in 2009)	0.534	0.112
Change in household health status – 1, 2 or 3 people in household changed	2.018	0.000
Change in employment status to at least 1 person unemployed and no-one employed	2.432	0.191
Equivalised disposable household income in 2009	0.985	0.002

It can be seen that the significant variables (at the 5% level) were change in health status, change in leisure time, change in household health status and income. The odds ratios were all positive, meaning

The number of major life events in the last year was insignificant after controlling for other variables that may influence wellbeing. One of the problems with this variable was that 70% of those who experienced homeostatic failure in the last year experienced no major life event (see Figure 3), so the homeostatic failure is associated with something else (possibly the variables identified as significant in Table 4).

Figure 3: Number of major life events for those experiencing homeostatic failure



The next step was to look at whether any major life events in particular were associated with homeostatic failure. To do this, we ran a regression with each of the major life events identified separately, along with the other indicators of health and social capital that we used for the model shown in Table 4. The results from this analysis are shown in Table 5.

Table 5: Results of logistic regression with all major life events separately

Variable	Odds Ratio	P > |t|
Married	0.592	0.221
Separated	4.807	0.001
Birth of a child	0.293	0.000
Serious personal injury/illness	1.646	0.184
Serious injury/illness of family member	0.826	0.600
Death of spouse or child	1.813	0.591
Death of close relative/family member	0.658	0.281
Victim of physical violence	1.334	0.765
Retired from workforce	1.340	0.531
Fired or made redundant	1.671	0.485
Changed jobs	1.509	0.357
Major worsening in finances	1.026	0.955
Changed residence	0.525	0.238
Reduction in physical functioning (SF36 scale)	0.888	0.746
Reduction in general health status (SF36 scale)	2.235	0.011
Change in leisure time (Satisfied with leisure time in 2008 but dissatisfied with leisure time in 2009)	3.450	0.000
Change in amount of voluntary work (Satisfied with amount of voluntary work in 2008 but dissatisfied in 2009)	0.578	0.194
Change in household health status – 1, 2 or 3 people in household changed	2.019	0.000
Change in employment status	2.108	0.376
Equivalised disposable household income in 2009	0.985	0.001

Comparing Table 4 and Table 5, it can be seen that identifying the major life events separately had little impact on the results for the other variables. While the odds ratios for some variables have changed slightly, none of the significance levels have changed at the 5% level. The P > t has increased for the change in employment status, but this was also insignificant at the 10% level in Table 4.

The two major life events that were significantly associated with homeostatic failure were being separated; and the birth of a child. Other factors that were associated with homeostatic failure were change in health; change in leisure time; change in household health status; and income. Becoming separated, worsening health, less leisure time, and more people in the household changing health status were all associated with a higher probability of homeostatic failure. The birth of a child was associated with a lower probability of homeostatic failure. Income also had a significant effect on the probability of homeostatic failure, and slightly reduced the probability of homeostatic failure, so it acts as a protective factor.

5 DISCUSSION OF RESULTS

The results in Table 5 suggest that once we control for changes in social capital and health (both of which have been shown to affect wellbeing – see ABS, 2001; Berry, 2010), there are two life events that affect wellbeing – getting divorced and having a

baby. None of the other life events (like death of a relation, victim of physical violence, being fired or moving) had a significant effect on wellbeing once changes in social capital and health are controlled for.

Further, the number of life events in the past year doesn't appear to have a significant effect on wellbeing – it is merely whether a particular life event (separation or birth of a child) occurred. This requires some more research looking at significant life events over a longer term, and this research is outlined in Section 6.

A change in leisure time from satisfied to dissatisfied was associated with a significant increase in the probability of homeostatic failure. This could be to do with a change in life circumstances, for example, changing to a more stressful job

The result showing that separation is associated with homeostatic failure is consistent with Cummins (2009), which showed that relationship support is a highly effective buffer for homeostatic failure.

Cummins (2009) also found that income was a protective factor in homeostatic failure, and this model confirms this, although the effect is very small. This is an interesting result, as we did expect income to have more of an effect on the probability of homeostatic defeat, although it may not be a protective factor against the types of factors that do contribute to a higher probability of homeostatic defeat in this model (separation, change in health status).

6 FUTURE WORK

While observing homeostatic defeat in frequency distributions of individual wellbeing, one interesting question that we have not been able to answer in this paper due to limitations in the geographic detail of the data is what contribution does individual wellbeing have on community wellbeing? And at what level does community wellbeing become so low that people leave?

To do this analysis, we need information on wellbeing at the community level, and we expect to get this through surveys conducted with the Cotton CRC of areas in the Murray Darling Basin. Using these data, we hope to use statistical methods to identify the "tipping point" in community wellbeing.

The theory of tipping points comes from Schelling (1969; 1972), in his study of racial segregation and has been popularised by Malcolm Gladwell's book (Gladwell, 2001). A tipping point is "the moment of critical mass, the threshold, the boiling point" (Gladwell, p. 12). In the context of community wellbeing, it can be seen as the point of community wellbeing where the stream of people leaving the area becomes a flood, and the area becomes unsustainable.

One statistical method to identify a tipping point uses a regression-discontinuity approach, which requires some estimate of the tipping point for small areas; and observations from a number of areas. Another method uses techniques borrowed from the literature identifying trend breaks in time series data, Card et al (2006) identified tipping points in segregation in neighbourhoods and schools using this method. Further

work using data collected through the Cotton CRC project, will use these methods to identify the tipping points for communities, and then what factors affect these community level tipping points.

Other further work that we would like to do is around the influence of major life events. We would expect the effect of major life events on wellbeing to diminish over time, but this will occur at different rates for different events. So the effect on wellbeing of having a baby may last for one year; but the effect of a death in the family may last for a number of years. There may also be a 'residual' effect of a major life event, so a death in the family may not affect wellbeing immediately but then when a second person dies 2 years later, the person may be more likely to suffer homeostatic defeat compared to someone who has only had one death in the family.

7 CONCLUSIONS

While other work like Berry (2009) has been on what factors influence wellbeing, this paper has taken a slightly different approach and looks at what factors influence homeostatic defeat. This is the first study that we know of in Australia that has considered a statistical model of what affects homeostatic defeat.

What we find is that two major life events affect the probability of homeostatic defeat. Having a baby reduces the probability of homeostatic defeat, and separation increases the probability. Worsening health status and decreasing leisure time also have a significant effect on increasing the probability of homeostatic defeat.

Income is also a protective factor for homeostatic defeat, reducing the probability slightly.

Interestingly, major life events like death of a relative and death of a child had no significant impact on homeostatic defeat, so homeostasis continues to support wellbeing after these major life events.

This work reinforces the impact that separation has on a person's wellbeing, and the impact on the rest of a family's wellbeing that a new baby brings.

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