HOW MUCH AND FOR WHOM DOES SELF-IDENTIFIED ETHNICITY CHANGE OVER TIME IN NEW ZEALAND? RESULTS FROM A LONGITUDINAL STUDY

Kristie N Carter[1]
Michael Hayward
Tony Blakely
Caroline Shaw
Health Inequalities Research Programme
School of Medicine and Health Sciences
University of Otago

Abstract

Ethnicity is often assumed to be a stable construct. However, much research in New Zealand has shown growth in the number of people reporting multiple ethnicities and changes in the ethnic composition of New Zealand, which may reflect social changes as well as changes in the construct of ethnicity. This study uses three years of data from the longitudinal Survey of Family, Income and Employment (SoFIE) to examine changes in self-identified ethnicity. Self-defined ethnicity is recorded every year and participants may record multiple ethnicities. A change in ethnicity was defined as any change in the reported ethnic group(s) of an individual over the first three waves of SoFIE. Overall, 8% of respondents changed ethnicity at least once during the three waves of the survey. The strongest predictor of changing self-identified ethnicity was Māori, Pacific and Asian ethnicity at wave 1, as well as reporting more than one ethnic group. Individuals who changed ethnicity were also more likely to be younger, to be born overseas, to live in a family with children, to belong to more deprived groups, and to have poorer self-rated health. This exploratory analysis has shown fluidity in the concept of self-identified ethnicity, but more longitudinal research is needed to further clarify the (in)stability of ethnicity over time.

INTRODUCTION

Ethnicity matters. It matters for individuals, for groups and for our nation. It matters in terms of shaping individual identity, understanding inequalities and targeting policy across a wide range of areas such as health, education and welfare. In New Zealand much work has been done on defining and measuring ethnicity, but it remains a challenging, and fluid, area (Statistics New Zealand 2004, Callister et al. 2008).

The concept that individuals should identify their own ethnicity is well established in New Zealand. However, an individual's ethnic identity is part of a wider social process and is influenced by their own perceptions of ethnicity and what they perceive others' perceptions are, within the world in which they live (Fenton 1999). Often it is assumed (if only as a simplification) that ethnicity is fixed over time and that ethnic boundaries are well defined. In reality an individual will identify with more than one ethnic group and/or may change their ethnic identity over time or in different environments (Callister et al. 2008). Indeed, affiliation with more than one ethnic group is relatively common: in the 2006 census 7.8% of respondents aged 15 years and older reported multiple ethnic groups (Statistics New Zealand 2007). Affiliation with multiple ethnic groups was highest in younger age groups and among those recording Māori or Pacific as one of their ethnic groups.

Ethnic mobility is defined as a change in ethnic affiliation over time. It is an important aspect of social change and represents an area of considerable interest, both in New Zealand and internationally. There are three possible sources of change in responses about ethnic affiliation: unreliability in measurement, changes due to alterations in the ethnicity question, and (the focus of this paper) conscious changes in ethnicity (Simpson and Akinwale 2007). Conscious changes may involve an alteration of ethnic identification (switching from one ethnicity to another), the addition of an ethnic group to (complexification), or deletion of a group from (simplification), a previous set of identifications.

Conscious changes in ethnic affiliation(s) may occur for any number of reasons. For example, changes may occur when children reach an age when they define ethnicity for themselves rather than having it determined by a parent or guardian (Kukutai 2008). People may answer a census question differently to how they answer a hospital form; the former may be construed as an opportunity to make a more political statement (e.g. the "New Zealander" response is far more common on census data than in other administrative data sets), and the census is answered in the privacy of one's home (Callister et al. 2008).

There are a number of other reasons for people identifying their ethnicity differently over time or context, such as social stigmatisation or alienation, changes in personal, professional or social groups, or changes in the political or economic society. Comparing ethnic group responses between different data sets in New Zealand may be invalid because the environment or context can change responses. In Canada, for example, Guimond (2006) found that the census count of the population with aboriginal origin went from 711,000 to 1,102,000 persons, with a large part of this growth occurring between 1986 and 1991. He noted that this fast growth could not be explained by natural and migratory increases alone, and that much ethnic mobility was occurring. This growth was particularly strong in urban areas and was associated with a strong rise in the post-secondary-educated graduates of aboriginal origin. Guimond concluded that it is important to understand legislative and social changes that may be a source of ethnic mobility. Each ethnic response is "valid" at the time and within the context in which it was asked.

In New Zealand, research into ethnic mobility has been limited. However, in a cross-sectional study of inter-censal change, Coope and Piesse (2000) found there was considerable mobility within some ethnic groups, with, for example, a 23% inflow and 6% outflow for the Māori ethnic group in 1996 compared to the 1991 group (Coope and Piesse 2000). There are a number of possible reasons for this, including changes in the ethnicity question between censuses, changes in the socio-political environment, ethnogenesis (the establishment of new ethnic categories such as "New Zealander"), and intermarriage (Callister et al. 2005, Howard

and Didham 2005, Kukutai 2007, Callister et al. 2008), as well as changes in the political structure.

In-depth analysis of changes in ethnicity and the factors associated with such mobility is only possible using consistent questions repeated over several years of a longitudinal study for the same individuals.[2] There is, however, no such published New Zealand empirical research, so in this exploratory analysis we outline changes in self-identified ethnicity over the first three waves of the longitudinal Survey of Family, Income, and Employment (SoFIE). The ethnicity question was asked directly of participants, face to face in their own home, at each consecutive wave without the interviewer or interviewee having access to responses to previous waves. Specifically, the research questions addressed in this paper are:

- What proportion of people changed their self-identified ethnicity over the three years?
- How does this proportion vary by individual socio-demographics?

METHODS

Study Data

We utilised data from the first three waves (October 2002/03, 2003/04, 2004/05) of SoFIE (wave 1 to 3 data, Version 4) (Carter et al. 2008). SoFIE is a nationally representative fixed-panel longitudinal survey of the usually resident population living in private dwellings. The initial SoFIE sample comprised approximately 11,500 responding private households (response rate of 77%) with over 22,000 adults responding in wave 1, reducing to just over 20,000 in wave 2 (91%) and 18,300 in wave 3 (83% of wave 1 responders). In SoFIE, face-to-face interviews are used to collect information annually on demographics and the social and economic characteristics of adults.

In this analysis, data were restricted to adults (15 years or older) who answered the ethnicity question in all three waves.

Measures

The following ethnicity question was asked in each wave:

> "Looking at showcard 7, choose as many responses as you need to say which ethnic groups you belong to."

---

[2] In 2008 research got underway on those students whose ethnicity recorded in tertiary education differs from that recorded at school (Baldwin 2008).

```
Showcard 7

11. New Zealand European / Pakeha
12. other European
13. Māori
14. Samoan
15. Cook Island Maori
16. Tongan
17. Niuean
18. Tokelauan
19. Fijian
20. other Pacific Peoples
21. Southeast Asian
22. Chinese
23. Indian
24. other Asian
25. other ethnic group
```

This ethnicity variable was then coded to the following level 1 categories: NZ European / Pākehā, Māori, Pacific, Asian, and Other.

For the purposes of this paper we constructed four variables relating to ethnicity.

1. *Total ethnicity.* For simple cross-classifications we simply used the total counts of people identifying as Māori, Pacific, NZ European, Asian or "Other". Note that the sum of the total counts will exceed 17,625 (total number of responding adults) due to people reporting two or more level 1 ethnic groups (total ethnic groups are not mutually exclusive).

2. *Combination ethnicities I.* We categorised people (at each wave) into those reporting just one level 1 ethnic group ("sole"), and two or more level 1 ethnic groups ("multiple"). Note that someone who self-identified with more than one Pacific or Asian ethnicity appears as "sole" using the level 1 categorisations in this paper.

3. *Combination ethnicities II.* We also constructed variables separately from the perspective of each of the level 1 groups. Thus, from the Pacific perspective one could be sole Pacific, Pacific plus at least one other group, or non-Pacific (any other ethnic group/s excluding Pacific).

4. *Changing ethnicity.* We classified anyone changing their self-identified ethnic group between waves 1 and 2 or between waves 2 and 3 as "change". Respondents may "change" their self-identified ethnicity by adding or subtracting an ethnic group to/from their previous wave response (e.g. Pacific and NZ European in wave 1, and sole Pacific in wave 2 = "change"), or responding with a totally different category (e.g. sole Māori in wave 1 and sole NZ European in wave 2 = "change").

The following demographic, social and economic variables have been used to explore the mechanisms discussed previously and their relationship with changing ethnic identification over the three waves of SoFIE. The following demographic characteristics were measured at the wave 1 interview: age, sex, legal marital status, family structure and household composition. It is hypothesised that younger populations are more likely to change their ethnicity because they are developing their own identity as they grow older. Marital status, family structure and household composition are used to investigate the influence of social mechanisms on changing ethnicity. Economic variables allow us to investigate whether changing ethnicity is more apparent in some social and economic groups. Household income

was derived by totalling adult annual personal income (before tax) from all sources received, Consumer Price Index adjusted, equivalised for household economies of scale using a New Zealand-specific Jensen Index (Jensen 1988), and categorised into quintiles based on the SoFIE population across waves 1 to 3. Labour-force involvement was defined as being either employed, not employed but seeking work, or not employed and not seeking work, at the time of the interview. The highest level of education was coded as no education, school, post-school vocational, or degree or higher qualification, across the three waves. The New Zealand Deprivation (NZDep2001) Index provides a neighbourhood-level (approximately 100 people) deprivation score (Salmond and Crampton 2002). The global self-rated health question ("In general would you say your health is excellent, very good, good, fair or poor?") was classified as fair/poor versus remaining answers.

These analyses will provide a baseline for future analyses of SoFIE data (once more waves of data are available) looking at the influences of changes in social and/or economic circumstances (i.e. moving from child to adult status, getting married or becoming unemployed) have on changes in self-identified ethnicity over time.

ANALYSIS

All analyses were conducted using SAS 8.2 within the Statistics NZ Data Lab, Wellington. Exploratory analysis was conducted using cross-tabulations to identify respondents who change ethnicity between the waves, by demographic and socio-economic variables. Logistic regression analyses were used to investigate the relative association of change in ethnicity by baseline socio-demographic variables.

All counts and values in the tables have been randomly rounded (up or down) to the nearest multiple of five, and cells with counts less than 10 were rounded to a minimum of 10. As a result, table totals may differ from the sum of individual cells. Some row percentages in the tables may also sum to greater than 100 because the percentages were calculated according to the random rounded totals.

RESULTS

A total of 17,625 original sample members aged 15 years or older at the wave 1 interview and who had responded in all three waves were included in this analysis. Table 1 presents the ethnic composition of the SoFIE population across the first three waves of SoFIE. Over 83% of the population reported NZ/European as one of their ethnic groups, with around 11% Māori, 5% Pacific, 5% Asian and 2% Other ethnicity. There is little variation in the share of the total ethnic groups in the population at each wave (although individuals are changing groups between waves, as shown below).

The majority of people (about 95%) reported that they affiliated with only one ethnic group (Table 1). This was stable over all three waves: 5.6% of people in wave 1 reported affiliating with more than one ethnic group, and in wave 3 this declined to 4.9%. The distribution of multiple affiliations was not equal: proportionately Māori (38.3%) and Pacific people (20.8%) were more likely to report affiliation with more than one ethnic group than NZ European (5.3%), at wave 3. About 10% of Asian and other ethnic groups reported multiple affiliations. Younger respondents were also more likely to report multiple ethnic groups.

Table 1 Distribution of 17,625 SoFIE Respondents by "Sole" and "Multiple" Ethnic Groups

Level 1 ethnic group		Wave 1		Wave 2		Wave 3	
		N	%	N	%	N	%
Everyone	*Total*	*17,625*		*17,625*		*17,625*	
	Sole	16,640	94.4	16,735	94.9	16,760	95.1
	Multiple	990	5.6	890	5.1	865	4.9
NZ/European	*Total**	*14,660*	*83.2*	*14,655*	*83.1*	*14,630*	*83.0*
	Sole	13,765	93.9	13,845	94.5	13,855	94.7
	Multiple[†]	895	6.1	810	5.5	780	5.3
Māori	*Total**	*1,925*	*10.9*	*1,885*	*10.7*	*1,835*	*10.4*
	Sole	1,105	57.4	1,135	60.2	1,130	61.6
	Multiple[†]	815	42.3	750	39.8	705	38.4
Pacific	*Total**	*830*	*4.7*	*780*	*4.4*	*795*	*4.5*
	Sole	635	76.5	615	78.8	635	79.9
	Multiple[†]	200	24.1	165	21.2	165	20.8
Asian	*Total**	*940*	*5.3*	*940*	*5.3*	*950*	*5.4*
	Sole	845	89.9	865	92.0	855	90.0
	Multiple[†]	95	10.1	80	8.5	90	9.5
Other	*Total**	*320*	*1.8*	*305*	*1.7*	*315*	*1.8*
	Sole	280	87.5	270	88.5	285	90.5
	Multiple[†]	40	12.5	30	9.8	30	9.5

* Total percentages are the proportional share of ethnic groups, by wave.
[†] Stated ethnic group plus at least one other level 1 ethnic group.

Table 2 shows the distribution of characteristics of respondents who had any change in their self-identified ethnicity between waves 1 and 2 and waves 2 and 3. There was no difference between males and females, but younger respondents were much more likely to change ethnic groups (e.g. 12.2% for 15–24-year-olds compared to 2.7% for those aged 75 years and over).

The strongest predictor of *changing* ethnicity between waves was ethnicity at wave 1. Using a total definition of ethnicity at wave 1, anyone self-identifying as "Other" (ie, any ethnicity other than NZ/European, Māori, Pacific or Asian) was the most likely to change ethnicity between waves (54.7%), followed by Māori (36.5%), Pacific (22.9%), and Asian (15.4%). NZ/European respondents were least likely to change ethnicity across the three waves (5.7%).

Alongside considering "total" ethnicity at wave 1, changing ethnicity was most likely among those people recording two or more ethnic groups – regardless of the actual combination. People self-identifying at wave 1 as NZ European and any other group, Māori and any other group, Pacific and any other group and Asian and any other group all had similar probabilities (over half) of changing ethnicity between waves: 56.4%, 57.1%, 62.5% and 63.2%, respectively. Sole NZ/European were the least likely (2.4%), and sole Asian and sole Pacific both had about a 10% probability of subsequent change in ethnic group. Sole Māori, however, had a 21.3% probability of changing ethnicity over waves.

Table 2 Distribution of the number of respondents reporting any change in ethnicity between waves 1 and 2 and waves 2 and 3, by wave 1 measures of socio-demographic characteristics

Wave 1	N	Any change in ethnicity N	%
Total	17,625	1,420	8.1
Sex			
Male	8,075	645	8.0
Female	9,540	775	8.1
Age			
15–24	2,510	305	12.2
25–34	2,820	295	10.5
35–44	3,770	350	9.3
45–54	3,235	245	7.6
55–64	2,510	130	5.2
65–74	1,670	75	4.5
75+	1,110	30	2.7
Total ethnicity, wave 1			
NZ/European	14,660	830	5.7
Māori	1,925	700	36.5
Pacific	830	190	22.9
Asian	940	145	15.4
Other	320	175	54.7
Ethnic-specific combinations, wave 1*			
Sole NZ/European	13,765	325	2.4
NZ Euro + other gp(s)	895	505	56.4
Non-NZ/European	2,965	595	20.1
Sole Māori	1,105	235	21.3
Māori + other gp(s)	815	465	57.1
Non-Māori	15,695	725	4.6
Sole Pacific	635	65	10.2
Pacific + other gp(s)	200	125	62.5
Non-Pacific	16,785	1,230	7.3
Sole Asian	845	85	10.1
Asian + other gp(s)	95	60	63.2
Non-Asian	16,675	1,280	7.7
Born in NZ			
Yes	13,950	1,050	7.5
No	3,670	375	10.2
Marital status			
Divorced, widowed, separated	2,995	195	6.5
Married	9,440	640	6.8
Never married	5,180	585	11.3

Std family type

Couple only	5,410	305	5.6
Couple with children	7,300	695	9.5
Sole parent	1,700	210	12.4
Not in a family nucleus	3,210	210	6.5

Household composition

One family	14,100	1,165	8.3
Other multi-person household	830	75	9.0
Two or more families	590	75	12.7
One-person house			

Labour-force status

Employed	11,215	900	8.0
Not employed, looking	395	35	8.9
Not employed, not looking	6,010	485	8.1

Maximum education

Degree/higher	2,585	210	8.1
No qualification	4,145	330	8.0
Post-school vocational qual.	6,255	520	8.3
School qual.	4,630	360	7.8

Equiv. household income

Q1: low – < $21,078	2,315	260	11.2
Q2: $21,078 – < $34,010	4,130	345	8.4
Q3: $34,010 – < $49,379	3,520	295	8.4
Q4: $49,379 – < $72,280	3,645	255	7.0
Q5: $72,280 – high	4,005	265	6.6

NZDep

Q1 (least)	3,445	155	4.5
Q2	3,615	245	6.8
Q3	3,095	230	7.4
Q4	3,880	355	9.1
Q5 (most)	3,580	435	12.1

Self-rated health

Excellent	6,610	495	7.5
Very good	5,855	465	7.9
Good	3,645	325	8.9
Fair/poor	1,510	135	8.9

Considering other socio-demographic factors, there were moderate increases in the probability of changing ethnicity for those: not born in New Zealand, never married, living in a family with children (i.e. couple with children, or sole parent), and in good or fair/poor self-rated heath (Table 2). (It must be noted that these are all crude percentages, and likely to be confounded by age and ethnicity at least – hence the multivariable analyses below.) Finally, the crude analyses demonstrate two- to three-fold differences in the chance of changing ethnic groups for those with low income or living in a deprived neighbourhood.

Table 3 presents results from logistic regression models. The first column contains univariate regressions, which are consistent with the results in Table 2, aside from being on an odds ratio scale. However, any of the univariate associations attenuate once all factors are adjusted for in the multivariate analyses. Multivariate logistic regression analyses were conducted by each ethnic group at wave 1, both to investigate what factors influence changing ethnicity within the main ethnic groupings and also to overcome the problem of non-mutually exclusive ethnic groups.

Generalising across the four multivariate models, younger age, not being born in New Zealand, living in a family with children, living in a deprived neighbourhood, and having poorer self-rated health all tended to be moderate to strong predictors of changing ethnicity. Income and education had modest independent associations only. Considering the four ethnic multivariate models separately, that for NZ/European had instances of varying associations; most notably, country of birth was not associated with changing ethnicity.

Table 3 Odds Ratios (95% Confidence Interval) of any Change in Ethnicity across Waves 1 to 3 of SoFIE by Socio-demographics for Univariate and Multivariate Logistic Regression Analyses

Wave 1	Univariate	Multivariate			
		European	Māori	Pacific	Asian
Sex					
Male	1	1	1	1	1
Female	1.0 (0.9–1.1)	0.9 (0.8–1.1)	0.9 (0.8–1.1)	1.0 (0.9–1.1)	1.0 (0.9–1.1)
Age					
15–24	1	1	1	1	1
25–44	0.8 (0.7–0.9)	0.9 (0.7–1.1)	0.8 (0.7–1.0)	0.9 (0.7–1.1)	0.9 (0.7–1.0)
45–64	0.5 (0.4–0.6)	0.8 (0.7–1.1)	0.7 (0.5–0.9)	0.7 (0.5–0.8)	0.6 (0.5–0.8)
65–74	0.3 (0.3–0.4)	0.7 (0.5–1.0)	0.5 (0.3–0.8)	0.4 (0.3–0.6)	0.4 (0.3–0.6)
75+	0.2 (0.1–0.3)	0.6 (0.4–1.0)	0.4 (0.2–0.6)	0.3 (0.2–0.4)	0.3 (0.2–0.4)
Born in NZ					
Yes	1	1	1	1	1
No	1.4 (1.2–1.6)	1.0 (0.8–1.2)	3.5 (3.0–4.1)	1.5 (1.3–1.7)	1.4 (1.3–1.7)
Legal marital status					
Never married	1.8 (1.6–2.0)	1.1 (0.9–1.3)	1.0 (0.9–1.3)	1.4 (1.1–1.6)	1.4 (1.1–1.6)
Divorced, widowed	1.0 (0.8–1.1)	1.0 (0.8–1.3)	1.0 (0.8–1.2)	1.1 (0.9–1.4)	1.1 (0.9–1.3)
Married	1	1	1	1	1
Std family type					
Couple only	1	1	1	1	1
Couple with children	1.7 (1.5–2.0)	1.0 (0.8–1.2)	1.2 (1.0–1.4)	1.3 (1.1–1.5)	1.3 (1.1–1.5)
Sole parent	2.3 (1.9–2.8)	0.9 (0.7–1.2)	1.0 (0.8–1.3)	1.2 (1.0–1.5)	1.3 (1.1–1.6)
Not in a family nucleus	1.2 (1.0–1.4)	1.0 (0.8–1.2)	1.0 (0.8–1.3)	0.8 (0.7–1.0)	0.9 (0.7–1.1)
Maximum education					
Degree or higher	1	1	1	1	1
School qual.	1.0 (0.8–1.1)	0.8 (0.7–1.0)	0.8 (0.6–1.0)	0.8 (0.7–1.0)	0.8 (0.6–0.9)
Post-school qual.	1.0 (0.9–1.2)	1.1 (0.9–1.3)	0.9 (0.7–1.1)	1.0 (0.9–1.2)	1.0 (0.8–1.2)
No qualification	1.0 (0.8–1.2)	0.9 (0.7–1.1)	0.8 (0.6–1.0)	1.0 (0.8–1.2)	0.9 (0.8–1.2)

Labour-force status					
Employed	1	1	1	1	1
Not employed, looking	1.2 (0.9–1.7)	0.7 (0.5–1.0)	0.7 (0.5–1.1)	0.8 (0.6–1.1)	0.8 (0.6–1.2)
Not employed, not looking	1.0 (0.9–1.1)	1.0 (0.8–1.1)	1.0 (0.9–1.2)	1.0 (0.9–1.2)	1.0 (0.9–1.1)
Equiv. household income					
Q1: low – < $21,078	1.8 (1.5–2.1)	0.9 (0.7–1.1)	1.0 (0.8–1.3)	1.2 (1.0–1.5)	1.2 (1.0–1.5)
Q2: $21,078 – < $34,010	1.3 (1.1–1.5)	0.9 (0.7-1.1)	1.0 (0.8–1.2)	1.1 (0.9–1.4)	1.1 (0.9–1.4)
Q3: $34,010 – < $49,379	1.3 (1.1–1.5)	0.9 (0.7–1.1)	0.9 (0.8–1.2)	1.0 (0.8–1.2)	1.0 (0.8–1.2)
Q4: $49,379 – < $72,280	1.1 (0.9–1.3)	0.8 (0.7–1.0)	0.9 (0.7–1.1)	0.9 (0.8–1.1)	0.9 (0.8–1.1)
Q5: $72,280 – high	1	1	1	1	1
NZDep					
Q1 (least)	1	1	1	1	1
Q2	1.6 (1.3–1.9)	1.3 (1.0–1.6)	1.4 (1.1–1.8)	1.4 (1.2–1.8)	1.5 (1.2–1.9)
Q3	1.7 (1.4–2.1)	1.1 (0.87–1.4)	1.4 (1.1–1.7)	1.6 (1.3–1.9)	1.6 (1.3–2.0)
Q4	2.1 (1.7–2.6)	1.2 (1.0–1.6)	1.6 (1.3–2.0)	1.8 (1.5–2.2)	1.9 (1.5–2.3)
Q5 (most)	2.9 (2.4–3.5)	10 (0.8–1.2)	1.4 (1.1–1.8)	2.3 (1.9–2.9)	2.4 (2.0–3.0)
Self-rated health					
Excellent	1	1	1	1	1
Very good	1.1 (0.9–1.2)	1.1 (0.9–1.3)	1.1 (0.9–1.2)	1.2 (1.0–1.3)	1.1 (1.0–1.3)
Good	1.2 (1.0–1.4)	1.2 (1.0–1.5)	1.3 (1.1–1.5)	1.4 (1.2–1.6)	1.4 (1.2-1.6)
Fair/poor	1.2 (1.0–1.5)	1.4 (1.1–1.8)	1.4 (1.1–1.7)	1.5 (1.2–1.8)	1.4 (1.2–1.8)
Ethnic-specific combination groups at wave 1					
Sole NZ/European	0.10 (0.08–0.11)	0.09 (0.08–0.09)			
NZ Euro + other gp(s)	5.2 (4.4–6.1)	4.9 (4.1–5.9)			
Non-NZ/European	1	1			
Sole Māori	5.6 (4.7–6.6)		7.7 (6.3–9.3)		
Māori + other gp(s)	27.4 (23.4–32.1)		37.7 (31.5–45.1)		
Non-Māori	1		1		
Sole Pacific	1.4 (1.1–1.9)			0.7 (0.6–1.0)	
Pacific + other gp(s)	23.1 (17.2–31.2)			17.1 (12.6–23.2)	
Non-Pacific	1			1	
Sole Asian	1.33 (1.05–1.68)				0.8 (0.6–1.1)
Asian + other gp(s)	23.0 (14.9–35.4)				17.4 (11.1–27.1)
Non-Asian	1				1

* Total ethnicity (not mutually exclusive).
Notes: Reference = not in that ethnic group. N = 17, 625.

Perhaps the key finding from the multivariate analyses was the persistent and strong association of wave 1 ethnicity with subsequently changing ethnicity. Allowing for the logistic model (i.e. odds ratios), the associations are broadly consistent with the results in Table 2 for simple proportions. For example, identifying with two or more self-identified

ethnic groups at wave 1 is a consistently strong predictor of subsequent change in ethnicity. The model for a Māori-centric categorisation of ethnicity does, however, highlight the fact that sole Māori have a 7.7 greater odds of changing their self-identified ethnicity compared to non-Māori; sole groupings for the other three ethnicities did not have increased odds of changing ethnicity when compared with their counterpart "non" ethnic group.

DISCUSSION

The aims of this paper were to explore and quantify the proportion of people in the SoFIE population who change their self-identified ethnicity over three years and to look at the socio-demographic factors that predict this change. Overall, 8.1% of the SoFIE population changed their level 1 ethnic group over the first three waves. Individuals who changed ethnicity were more likely to be younger, to be born overseas (for Pacific, Asian and Māori changes at least), to live in a family with children, to be in more deprived groups, and to have poorer self-rated health.

However, by far the biggest predictor of changing ethnicity in waves 2 to 3 was one's ethnicity at wave 1 – especially how many ethnic groups one self-identified with. Over half of all people with two or more ethnic groups at wave 1 had a change at the level 1 ethnic coding over waves 2 to 3. Second, those self-identifying solely as Māori had a 21.3% chance of changing their level 1 ethnic grouping in the subsequent two waves. These baseline ethnic group predictions of subsequent change in ethnic groupings persisted after adjustment for other socio-demographic predictors.

Both census and birth registration data show that over time more people have been identifying with multiple ethnic groups (Callister et al. 2008). Dual or multiple ethnicities are particularly common among Māori and Pacific people and, somewhat connected with this, among young people. A number of New Zealand studies show that allocation of ethnicity to babies and young children is not a straightforward process and is influenced by a range of factors, including intermarriage of parents (Callister 2003, Howard and Didham 2005, Kukutai 2007, 2008). We cannot show whether multiple responses of young or older people stabilise over time. However, we have shown in the current analyses that the proportion of people responding with multiple ethnicity is declining over time, with more people identifying with only one ethnic group. Some reasons for this finding are that respondents are possibly self-prioritising over time, or it could be due to just survey exhaustion. It is our aim, with more years of SoFIE data, to investigate if and how individuals' responses to self-identified ethnicity stabilise over time and how changing social and economic circumstances influence these.

The strengths of our analysis include the use of repeated measures on the same individuals over time, and (most importantly) the use of the same question, with both interviewer and interviewee blinded to the responses at previous waves. Thus, our results are not driven by questionnaire changes or defaulting to prior recorded ethnicity. Rather, changes must be due to either a "conscious" decision on the part of the respondent or unreliability of measurement. Simpson and Akinwale (2007) have shown that unreliability in measurement may occur due to errors of response, transcription or coding, or simply question ambiguity (Simpson and Akinwale 2007). However, as mentioned previously, stringent survey techniques used in SoFIE aim to control for these errors.

One limitation is possible selection bias. Those SoFIE respondents with data for all three waves represent 83% of the total eligible SoFIE adult population at wave 1. It is plausible that changing ethnicity varies in magnitude and pattern among non-responders. For example, it was found that rates of attrition were higher in respondents reporting Māori and Pacific ethnicity at wave 1 (Carter et al. 2008). In the SoFIE population only 5% of respondents reported multiple ethnic affiliations, which is much less than was found in the 2001 and 2006 census populations aged 15 years and older (6.5% and 7.8%, respectively). As shown in the results, Māori and Pacific people are more likely to report multiple affiliations, and respondents with multiple affiliations were more likely to change ethnicity over time. This could mean that the current results are potentially underestimating the number of people changing ethnicity due to non-response. These results may not be generalisable to the NZ population, but they are internally valid due to controlled questioning in the survey methods and analysis.

Another key limitation is the limited time of follow-up (three years to date). Extra waves of observation (which are forthcoming) will assist in two ways. First, they will allow a determination of changes over the medium and long term as opposed to just three years. Second, and perhaps more importantly, they will allow some determination of "conscious" changes as opposed to "random" fluctuations. For example, if we observe someone reporting sole Pacific on the first two waves, then Pacific and European on all subsequent waves, this enduring change may be interpreted as a more conscious change than churn over time. With more waves of SoFIE data we will also be able to investigate the influences that changes in social, economic or health circumstances have on changes in self-identified ethnicity over time.

There are many implications of our (and others') findings. First, changing ethnicity is common. This does not mean it is error-laden change and that ethnicity is a highly context-dependant variable. Nor does it mean that ethnicity is a weaker social variable because of its "volatility"; one only has to look at the stark differences in social and health outcomes by ethnicity in New Zealand to appreciate that, despite being a dynamic construct, it is also an extremely powerful determinant of social inequalities.

Second, it is reasonable to hypothesise that just as people who are sole Māori and sole European at any one point in time have more divergent health status than those from the total Māori and total European groups, so too health status may be even more divergent for those who are constantly sole Māori or sole European. That is, just as people with two or more ethnic groups have mortality rates in between the two (or more) sole groupings, so those with changing ethnicity may demonstrate intermediary health (and social) status.

Third, the finding in the multivariable analyses that neighbourhood deprivation remains a strong predictor of changing ethnicity, but not income or education, is intriguing. It is possible that the NZDep variable may be acting as a partial proxy for living in environments with greater heterogeneity in terms of the ethnicity of one's neighbours and social contacts.

Fourth, and of direct relevance to health researchers, the finding that a simple measure of self-rated health predicts changing ethnicity over and above other socio-demographic factors is also intriguing – and a little concerning. As social epidemiologists tracking health disparities in New Zealand, we are often asked whether changing ethnic groupings over time may "spuriously" give rise to changing ethnic inequalities over time. Our answer to this challenge had been "probably not", based on the fact that the 5–10% of people changing

ethnic groups between (say) censuses would have to have very different health status from the stable 90–95% of people to greatly distort the overall mortality rate (say) for the group in question (e.g. Māori or Pacific). This logic still stands, but the results in this paper suggest that those at risk of death (as reflected by poorer self-rated health) may actually be more likely to change ethnic group over time than those not at risk of dying. What does this mean for current health statistics and health priorities?

These results raise questions about the future ethnic composition of New Zealand. For example, are people who self-identify as both Māori and European a distinct group from those who identify as only Māori or only European? Who is the "New Zealander" group? These are contentious, interesting and difficult issues, and not ones that this research alone will answer. But this research will contribute to the discussion by gaining some understanding of the dynamics over time.

Do the results of this paper reflect a true change in affiliation, or a change in response due to the circumstances of the questionnaire, the day of the week, or what happened last weekend? How can we be certain that a person's ethnic identification today is going to be the same as tomorrow or next year? Irrespective of the exact underlying drivers for each individual change in ethnicity, the current results demonstrate that ethnicity is dynamic, not static. This needs to be understood in any demographic analysis or interpretation of ethnicity data, and may also have an impact on research into ethnic inequalities in health, for example. It provides challenges for measuring long-term trends by ethnicity if the changes we expect or observe are small, and therefore perhaps explained by varying characteristics of those migrating into and out of various ethnic groups. Fluid reporting of ethnicity requires further understanding and analysis, both internationally and in New Zealand. SoFIE data provide a rich source for such analysis in the future.

REFERENCES

Baldwin, K. (2008) "Nominated ethnicity changes of students from secondary to tertiary education: Secondary to tertiary transitions" *Who Are We: Ethnicity and Identity Seminar*, Statistics New Zealand, Wellington.

Callister, P. (2003) "Maori/non-Maori ethnic intermarriage" *New Zealand Population Review*, 29(2):89–105.

Callister, P., R. Didham and A. Kivi (2008) "Who are we?: The conceptualisation and expression of ethnicity" *Official Statistics Research Series*, 4:1–56.

Callister, P., R. Didham and D. Potter (2005) "Ethnic intermarriage in New Zealand" *Official Statistics Research Series*, 1:1–73.

Carter, K., M. Hayward and K. Richardson (2008) *SoFIE-Health Baseline Report: Study Design and Associations of Social Factors and Health in Waves 1 to 3: SoFIE-Health Report 2*, University of Otago, Wellington.

Coope, P. and A. Piesse (2000) *1991–1996 Intercensal Consistency Study*, Statistics New Zealand, Wellington.

Fenton, S. (1999) *Ethnicity: Racism, Class and Culture*, Basingstoke, Macmillan.

Guimond, E. (2006) "Ethnic mobility and the demographic growth of Canada's aboriginal populations from 1986 to 1996" in A. Belanger (ed.) *Report on the Demographic Situation in Canada 1998–1999*, Statistics Canada, Ottawa, Canada.

Howard, S. and R. Didham (2005) "Ethnic intermarriage and ethnic transference amongst the Maori population" *Official Statistics Research Series,* 1:1–23.

Jensen, J. (1988) *Income Equivalences and the Estimation of Family Expenditure on Children*, Department of Social Welfare, Wellington.

Kukutai, T. (2007) "White mothers, brown children: Ethnic identification of Maori–European children in New Zealand" *Journal of Marriage and Family,* 69(5):1150–1161.

Kukutai, T. (2008) *Ethnic Self-Prioritisation of Dual and Multi-Ethnic Youth in New Zealand: A Discussion Paper*, Statistics New Zealand, Wellington.

Salmond, C. and P. Crampton (2002) *NZDep2001 Index of Deprivation*, University of Otago, Wellington.

Simpson, L. and B. Akinwale (2007) "Quantifying stability and change in ethnic group" *Journal of Official Statistics*, 23(2):185–208.

Statistics New Zealand (2004) *Report of the Review of the Measurement of Ethnicity*, Statistics New Zealand, Wellington.

Statistics New Zealand (2007) *QuickStats about Culture and Identity: 2006 Census*, Statistics New Zealand, Wellington.