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How meaningful are data from Likert scales?: an evaluation of how ratings are made and the role of the response shift in the socially disadvantaged.

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Abstract

This study explored the meaningfulness of Likert scale data and the processes involved in making judgements using such scales. Likert scales relating to aspects of quality of life were completed by three populations varying in social deprivation and consistency of circumstance: i) the homeless (n=75) ii) 1st year students (n=301) iii) a town population (n=72). Participants also completed free text questions. The results showed many contradictions between scale and free text data. For example, although the homeless rated themselves as more healthy, less tired and comparably hungry on the scales their free text accounts described long periods of not eating, poor sleeping arrangements and many health problems. The data illustrated three processes that may account for these disparities and reflect the notion of a response shift. First, participants used different frames of reference when interpreting the questions; student descriptions of accommodation emphasised their social lives but the homeless described sleeping arrangements. Second, participants drew upon within subject comparisons and rated aspects of their lives according to what they felt they could expect given past experiences. Finally, participants varied in their choice of time frame and those with more stable circumstances showed habituation to their level of deprivation. Data from Likert scales are problematic and should be understood within the context of how such ratings are made.

Key words: Likert scales; rating scales; decision making; social deprivation; response shift

Introduction

Much quantitative research within psychology relies upon the use of numerical scales and in the main Likert scales have emerged as the dominant measurement tool. This approach, however, has not persisted without criticism and much has been written about its limitations.

Primarily researchers have emphasised the psychometric limitations of the Likert scale and have debated whether the resulting data are ordinal or interval (Blaikie, 2003; Cohen, Manion and Morrison, 2000), whether a mid point should be used (Cox, 1980; Garland, 1991) and have explored the extent to which the number of categories on a scale and the use of numbers versus labels influences the responses given (Matell and Jacoby, 1972; Matell and Jacoby, 1971; Worcester and Burns, 1975; Wildt and Mazis, 1978; Kieruj and Moors, 2010).

Researchers have also addressed their limitations for cross cultural research highlighting differences between cultures in scale completion rates, familiarity with scales and the impact of translation and modesty (eg. Chen, Lee and Stevenson, 1995; Hui and Triandis, 1989; Lee et al, 2002; Heine, Takata and Lehman, 2000; Greenfield, 1997). Further, Peng, Nisbett and Wong (1977) identified how cultural differences emerging from Likert scale data do not always concur with differences predicted by cultural experts and offered two explanations for this mismatch. Firstly, they suggested that a deprivation model may be operating which reflects Maslow's notion of a hierarchy of needs with people placing greater value upon what they do not have rather than what they have (Maslow, 1943). Secondly, they argued for a reference group effect with members of different cultures using other members of the same culture for comparison when rating their responses rendering cross cultural comparisons problematic. Such comparisons find reflection in Festinger's social comparison theory and have been evaluated not only in the context of the use of Likert scales in cross cultural research but also across a multitude of domains throughout psychology (Festinger, 1954).

Between groups comparisons have also been described within the framework of 'shifting standards' (Biernat et al, 1991) and is exemplified by Volkmann's rubber band model of scale completion which suggests that people set the endpoints of Likert scales according to the group they are considering (Volkmann, 1951).

Accordingly, Likert scales are not without their limitations and researchers have highlighted a number of psychometric and conceptual issues. Central to much of this debate is the role of social comparisons and their impact both upon the ways in which scales are completed and the resulting data. In particular, the literature emphasises between subject comparisons as individuals are seen to make judgements relative to those around them. People also, however, consistently base their judgements upon within subject comparisons according to where they believe they should be in their lives or where they have been in the past. Such within subject comparisons have been neglected within research on Likert scales but are apparent within the context of health psychology research, particularly within recent discussions about quality of life and the notion of the response shift (e.g. Rapkin and Schwartz, 2004). Quality of life research is often inconsistent presenting challenges to those involved in its measurement. Some of this variation has been attributed to measurement error. Increasingly, however, it is seen as an illustration of the appraisal processes involved in making quality of life assessments and has been addressed within the context of the response shift by Rapkin and Schwartz (2004). They argued that each time a person judges their quality of life they must establish a 'frame of reference' which determines how they comprehend the questions being asked (what do the words 'health', 'mood', 'family', 'work' mean to them?). Next they decide upon 'standards of comparison', which includes both between and within subjects comparisons, to decide whether to judge their quality of life in terms of their own past history, their expectations of themselves or other people they know

(‘am I better off or worse off than I have been or than other people?’). Then they decide upon a ‘sampling strategy’ to determine which parts of their life they should assess (‘should I think of right now or how far back should I go?’). People then combine these three sets of appraisals to formulate a response. From this perspective, inconsistencies in the quality of life literature are no longer seen as a product of measurement error but as illustrations of the complex ways in which people make judgements about their health. To date, the processes involved in making decisions outlined by Rapkin and Schwartz (2004) have yet to be assessed empirically.

Therefore, although much quantitative research within psychology uses the Likert scale it is not without its flaws. The present study therefore aimed to assess the meaningfulness of Likert based data with a focus on the processes involved in rating such scales. In addition, the study aimed to offer insights into the impact of the context of when scales are rated by collecting both quantitative data from Likert scales and free text answers to open questions. Further, in line with work on the response shift, the study focused on aspects of quality of life within a much neglected domain of psychological theorising: social deprivation and the homeless. Finally, the study aimed to explore the role of both within and between subject comparisons by comparing a homeless population with two relatively non-deprived social groups, one of whom had recently experienced a change in their living situation (1st year students living in university accommodation) and one who were living within a stable living situation (a town population).

Method

Design

The study involved a cross sectional design with three samples who completed a brief questionnaire concerning aspects of their quality of life using Likert scales and additional open ended questions with space for free text to describe the context to their answers. The students and town dwellers completed the questionnaires themselves. The homeless either completed it themselves or were helped by the researcher due to problems with literacy. The University Ethics committee approved the study.

Participants

The study involved three samples who reflected differing levels of deprivation and had either been living within this standard for a period of time (i.e. homeless and town) or had experienced a recent change in their situation (i.e. students). All participants lived within the same relatively affluent small city in the South of England.

i) **Homeless population** (n=75): People who were either homeless, sofa surfing or living in temporary accommodation completed a questionnaire when visiting a community drop in centre which offers free clothes and blankets, subsidised food and drink and supports its clients in finding accommodation, claiming benefits and accessing local services.

ii) **Students** (n=301): An on line questionnaire was sent to all 1st year students at a campus University in the South of England located near an affluent town. Completed questionnaires were returned by 355 students. Of these 54 were excluded as they were living with their parents or in self-owned accommodation. All remaining students had recently moved away from home and either lived on campus in University accommodation or in rented accommodation in the town.

iii) **Town population** (n=72): Questionnaires were completed by 100 consecutive participants who were approached by the researcher in the town centre. Of these 29 were

excluded as they were students at the University or surrounding colleges. The remaining population all lived in or around the town and either worked full time or part time, described themselves as working parents or were unemployed.

Participants' demographics are shown in table 1 (insert about here). The large majority of the homeless were male whereas the students and those from the town were predominantly female. The majority of all groups were white although the student and town groups consisted of some ethnic minorities. The homeless group varied most in age.

Measures

Quantitative data were collected using a questionnaire with Likert scales. The items were selected to be appropriate to all participants regardless of level of deprivation but also to address those issues specifically relevant to the homeless and their basic needs. Additional open ended questions were asked generate free text data and to enable participants to provide the context for their answers and to gain some insights into how their quantitative responses had been made.

1.Likert scales

Participants rated the following using 5 point Likert scales (not at all (1), rarely (2), somewhat (3), fairly (4), very much (5)). All items for mood and health status referred to how participants were feeling 'Right Now'. Those for satisfaction related to how they had felt 'in the past few days'.

i)Mood: This was assessed with the following items: 'content', 'frustrated', 'bored', 'lonely', 'friendly', 'fed up', 'angry' and 'calm'. These items were taken from the Profile of Mood States (POMS; McNair Lorr and Dropplemann, 1977).

ii)Health status: Participants were asked to rate the extent they felt ‘tired’, ‘hungry’, ‘thirsty’ and ‘healthy’.

iii)Satisfaction: Participants were asked to reflect on their satisfaction with ‘what you have eaten’, ‘where you have slept’, ‘who you have talked to’, ‘how people have treated you’, ‘how you have reacted to others’, ‘how comfortable you have been’ and ‘being able to get help if you needed it’.

2. Free text responses

Participants were also asked 2 open ended questions and given space to write down their thoughts and feelings as a means to access the context to their answers. In particular they were asked to describe their accommodation and their eating behaviour.

3.Demographic variables

All participants described their age, gender, occupation (student, full time employment, part time employment, unemployed, parent), accommodation (student accommodation, rented house or flat, own house or flat, council owned house, hotel / hostel, rough sleeper, parents’ house or flat) and ethnicity (White, Black, Asian, other).

Data analysis

The quantitative data from the Likert scales were analysed using ANOVA and LSD post hoc tests to explore differences in mood, health status and satisfaction between the three groups.

The free text accounts were coded using content analysis and exemplar quotes were identified to explore how participants were making sense of their quality of life and to evaluate the ways in which the context of where and when the Likert scales were rated impacted upon their responses to these scales. For clarity, the quantitative data from the scales and the free

text accounts are analysed separately in the results section. Analyses across these two forms of data in terms of contrasts and contradictions are made in depth in the final discussion.

Results

1.Quantitative data (see table 2).

-insert table 2 about here -

i) Mood

The results showed significant main effects of group for mood in terms of feeling frustrated, bored, lonely, friendly, fed up, angry and calm. No differences were found for feeling content. Post hoc tests indicated that the homeless and the students were less frustrated, lonely and angry and more calm than the town population. However, whereas the homeless were more friendly than the other two groups, the homeless and the town groups were more bored and more fed up than the students.

ii) Health status

The results showed significant main effects of group for feeling tired and healthy but not for feeling either hungry or thirsty. Post hoc tests indicated that the homeless were less tired than the other two groups and that the homeless and the students reported feeling more healthy than the town population.

iii) Satisfaction

The results showed significant main effects of group for satisfaction with what participants had eaten, who they had talked to, how they had been treated by others, how they had reacted to others and how comfortable they had been. No differences were found for satisfaction with where they had slept or with being able to get help if they needed it. Post hoc tests

indicated that the homeless and the students were less satisfied with what they had eaten compared to the town population and that the homeless and the town population were less satisfied with who they had talked to, how they had been treated and being comfortable than the students. The homeless group were most satisfied with how they had reacted to others.

The quantitative data from the Likert scales therefore showed some significant differences between the three groups although these were not always in the expected direction. For example, the homeless reported having better mood, feeling less tired and more healthy than the other groups which would not be in line with a priori predictions made on the basis of experience of this population. Further, the Likert scale data also revealed some surprising non significant differences with the homeless reporting similar levels of feeling hungry and satisfaction with where they had slept. The free text responses were then analysed to provide some insights into the processes involved in completing these scales.

2. Free text responses

The free text comments were coded by both authors and as the majority reflected more than just one of the areas covered by the Likert scales they were grouped into two main themes relating to i) accommodation, mood and social interaction and ii) eating behaviour and health. These will now be described by participant group with the use of exemplar quotes. These free text responses provide some insights into the context behind the ratings on the Likert scales and illuminate the ways in which the Likert scales were completed. They also highlight the impact of both within and between group comparisons.

i) Accommodation, mood and social interaction

Students: When asked about their accommodation the majority of the students' comments referred to their new found independence at University and they described their accommodation in the context of their enjoyment of their social lives. The emphasis was on communal living, pleasure, making new friends and the autonomy gained from having left home. For example, students described the following:

“I’m living in Uni accommodation- really enjoying it, get on quite well with my flat mates” (student)

“Living on campus with 14 flatmates. Very sociable and enjoyable as everybody looks out for each other” (student)

“I am living in student halls about 100 miles away from home. I think I'm taking pretty good care of myself and am enjoying the independence” (student)

A small minority commented on the actual accommodation itself and for some this was positive describing ‘my room is fairly nice’ and ‘I live in a house near uni, comfortable, warm, safe’. Most of those who focused on the physical nature of their accommodation, however, were critical of the size of their room, levels of heating or noise and made comparisons with their lives back with their parents. For example comments included:

“Very noisy student accommodation” (student)

“Living on campus BUT no heating in the room” (student)

Some also commented on their lack of money which they were finding difficult to manage:

“Living on campus, very short of money so not living very well” (student)

“Campus accommodation on an extremely low living budget” (student)

Town: In their accounts, the town group solely commented on the physical state of their accommodation with no mention of their social interactions or emotional state. Their comments were equally split between positive and negative comments. More positive comments included:

“I have my own mortgaged accommodation, a very nice apartment in a good locality”

(town)

“I have my own place which I love” (town)

“Reasonable size room with a comfortable bed” (town)

In contrast, some negative comments were offered which emphasised the following aspects of their accommodation:

“Living in a rent house with no heating” (town)

“Living in a council house on a noisy estate” (town)

Homeless: The free text comments of the homeless population were more clearly differentiated into aspects of their accommodation and aspects of their social interactions and mood. When talking about their accommodation, as with the town group, the homeless also primarily focused on the physical aspects of their environment but were remarkably positive about their sleeping arrangements, given that they were living under bushes, in car parks, in doorways or on friends’ sofas which ‘objectively’ would be regarded as harsh and unpleasant. This appeared to reflect their use of within subject comparisons to times in their lives when they had been even worse off. For example, comments included:

“I spent a weekend at my brother’s on his floor. He found me a duvet and I wrapped it around me. It was wonderful” (homeless)

“I’m sleeping in the car at the moment which is so much better than being on the streets” (homeless)

“I’m in the hostel which is great” (homeless)

“I’ve borrowed a sleeping bag from the centre so it’s better than it was” (homeless)

‘It used to be worse when sleeping rough but now I’m squatting which isn’t so bad’ (homeless)

This positive evaluation wasn’t universal, however, with one man describing how he was exhausted as he kept getting disturbed:

“I get moved on by police at 2am every morning as I sleep in a car park. Private property you know” (homeless)

They were also surprisingly positive about their social interactions and the quality of their lives. This may reflect that the questionnaires were completed whilst at the drop in centre but their comments emphasised the kindness and support of others and the help they received from being around other people in a similar situation. These comments illustrated how they used between subject comparisons with those worse off to maintain their positive appraisal of their lives:

“It’s good to have somewhere to go, people with similar problems... Can realise I’m not so bad as others” (homeless)

“Good support here... there are always people in worse situations” (homeless)

Two men, however, provided insights into the less positive side of being homeless and the ways in which social interactions can be dangerous and problematic:

“I’m sharing a room with a guy at the hostel who I hate” (homeless)

“I get beaten up by pikeys on their way from pubs. I always carry a stick. I’m good with a stick” (homeless)

The accounts of the homeless were therefore predominantly positive in terms of the physical aspects of where they were sleeping and / or living and the social interactions they experienced. They also mentioned in passing, however, a wide range of psychological problems including depression, psychosis, OCD, anxiety, drink and drug addictions. Further, they highlighted how they felt when the centre was closed using words such as ‘bored’, ‘horrible’, ‘awful’, ‘lonely, really lonely’ and how at the weekends they were very isolated: ‘I haven’t spoken to anyone all weekend’, ‘Saturday is a bad day, an empty day’, ‘Been on my own all weekend’. Accordingly, although their evaluations of their situation were optimistic there was a background of problems which didn’t seem to be reflected in their accounts when focusing on the present moment.

ii) Eating / drinking / feeling healthy

Students: When asked about their eating behaviour most students described the number of meals they ate during the day, with a focus on types of food being consumed. The majority consumed three meals a day and they were very factual in their responses describing what and when they ate. Most didn’t mention their health and no students described feeling hungry. Examples included:

“Breakfast at home, lunch in café at University, dinner at home. Cereal/ toast, sandwich for lunch and proper cooked dinner” (student)

“3 meals a day, cereals and coffee for breakfast, soup and salad for lunch, and meat and veg stir fry for tea” (student)

A small minority did refer to their health but only in the context of how healthy they thought their diet was:

“Three meals a day, fairly balanced diet” (student)

“I eat on a regular basis and eat fairly healthy food, including vegetables and fruits, pasta and fish and meat dishes. I have lunch at the University and all other meals at home!” (student)

A few also described how their diet at university was not as balanced as they felt it should be due to factors such as time, the availability of fast food and a preference for sweet foods:

“I eat too much chocolate which has made my cholesterol too high and I have a doctors app. about it tomorrow” (student)

Town: The responses from the town group were very similar to the students with the emphasis being on number and content of meals consumed. For example:

“Try to cook whenever I have time, 3 meals a day” (town)

“Standard three meals with reasonable concern for healthy eating. Fairly often make meals from scratch” (town)

Some also emphasised how their diets were healthy:

“I eat lots of fruit and veg and drink plenty of water” (town)

“Have mainly salads or healthy option products” (town)

Whereas some were aware that their diets could be improved:

“On weekends I’ll go for lunch and not watch what I eat. However I hit the gym 4 times a week. But this weekend I had a really unhealthy weekend so I feel horrid now and guilty.” (town)

Homeless: The accounts of the homeless, however, were very different to both the students and the town population. They provided no details of what was eaten and food seemed far less important. Paradoxically many commented on not being hungry and not eating very often.

“I never get hungry...but I haven’t eaten for days” (homeless)

“I don’t really need to eat much” (homeless).

One man who said he wasn’t hungry then described:

“I don’t get hungry...I haven’t eaten since Friday” (data were collected on the following Monday), (homeless)

The homeless were also relatively positive about their health stating that they were feeling ‘fine’ and ‘well’ and ‘ok’. However, it was known via the staff at the centre that the people interviewed suffered from a huge range of physical health problems and that many took a complex combination of medicines that were often managed by the centre managers.

Common problems included alcohol and drug problems, diabetes, thyroid problems, angina, heartburn and back pain. In addition, the majority also had serious problems with their teeth and a minority had new bruises and cuts on their faces and hands which on questioning turned out to be the result on recent incidents on the streets.

The qualitative data therefore illustrated how the different populations interpreted the questions in different ways and focused on different aspects of their lives when offering answers. Furthermore, many discrepancies were apparent between the answers given to the Likert scales compared to the free text responses. These issues will now be discussed in depth.

Discussion

The present study aimed to explore the meaningfulness of using Likert scales in a socially disadvantaged group, namely the homeless, and to explore the processes involved in completing such ratings with a focus on context and the use of within and between group comparisons.

Overall the results showed some striking contradictions between data collected from Likert scales compared to the free text accounts. In particular, whereas the homeless reported feeling less tired and more healthy than others when using the Likert scales their qualitative accounts illustrated problems with sleeping and a wide range of physical health problems. Further, whilst they rated themselves quantitatively as having a better mood in terms of feeling frustrated, lonely and angry their free text accounts highlighted a wide range of psychological problems such as anxiety, depression and problems with drug and alcohol addiction. In addition, although no differences between groups were found for feeling hungry and satisfaction with where participants had slept, differences could be seen in their accounts of when and what they had eaten and where they had been sleeping. Such inconsistencies between different forms of data may reflect measurement error and the psychometric limitations of Likert scales (eg. Blaikie, 2003; Kieruj and Moors, 2010). They

also reflect reports that quantitative and qualitative measures of quality of life are often different (Rapkin and Schwartz, 2004). They also, however, enable insights into how responses are made to different forms of measurement and the decision making processes involved. These will now be explored.

First, the results illustrate how different populations interpret the focus of the same question in different ways. For example, when asked to describe their accommodation, whereas the homeless focused on the physical state of where they slept including the location and bedding, the main focus of the students' accounts was the social nature of their new living environment. When asked about food, although the students and the town population described in detail how often they ate and what they consumed, the homeless were far less expansive and food seemed to have less meaning and importance for them. Further, descriptions of eating behaviour by both the students and town participants were embedded with notions of health and a healthy diet, whereas the homeless populations offered more minimal descriptions concerned only with the timing of meals. Rapkin and Schwartz (2004) emphasised the response shift as central to how judgements are made about an individual's quality of life and highlighted three key mechanisms. The data from the present study illustrate a role for the first of these, namely 'frame of reference' and indicate that when answering questions different populations may implicitly use very different frames of reference with the focus of the question being interpreted within the context of a different aspect of their lives.

The results from the present study also provide support for the second mechanism of the response shift, namely the 'methods of comparison'. Previous research emphasises the role of between subject comparisons within the framework of social comparison theory and highlights how individuals answer questions according to the reference group effect which

has also been described as ‘shifting standards’ or the ‘rubber band model’ of questionnaire completion (Peng, Nisbett and Wong, 1977; Festinger, 1954; Volkmann, 1951; Heine et al., 2002). In line with this, some of the quotes in the present study reflected between group comparisons with the homeless, in particular, finding benefit from being with others who they perceived as worse off than themselves. Disparities between the Likert scale and free text data in the present study, however, indicate that many decisions about how to answer a given question may be more reflective of within subject comparisons. For example, when describing many aspects of their lives the homeless population could be seen to be making judgements according to their own past experiences rather than the experiences of others. For example, their recent sleeping experiences were considered positive when compared to past more negative times and low ratings of hunger reflected how they were used to poor levels of food intake. Similarly, when describing the physical aspects of their accommodation students were critical of their circumstances in student residences comparing these to the quieter, larger accommodation of their parent’s houses but were positive about the relatively more sociable and independent lives they were now living.

Finally, the results also suggested that participants may differ in their choice of time frame when making judgements and that the chosen time frame may influence how they feel about aspects of their health. In particular, it is possible that the homeless population’s positive ratings of their health, (whilst at the same time describing (or being known to have) a number of physical and psychological problems), and ratings of hunger and sleeping circumstances which were comparable to the other two groups, were not only due to within subject comparisons but also illustrate the impact of time on their judgements. By becoming accustomed to their reduced standard of living, their quality of life appears to be relatively improved. Accordingly, they are neither hungry nor tired because their levels of hunger and

tiredness have become normalised within the time frame being used to make judgements about their quality of life. Similarly, they report being healthy as having a number of physical and psychological health problems is their baseline from which change is calibrated. In contrast, those students who made criticisms of their accommodation did so within the time frame of having recently experienced a change in their situation towards a relative deficit in standards. Previous analyses have highlighted the deprivation model whereby participants are deemed to rate more highly that which they do not have (Peng, Nisbett and Wong, 1977; Heine et al., 2002). This may be the case for those who have experienced a recent shift in their circumstance. But for those participants who have been deprived of an aspect of their life for a sustained period of time, habituation rather than sensitisation may be the response. Accordingly, if an individual selects a time frame within which their circumstances have been consistently deprived, then the impact of deprivation over this time becomes less rather than more salient. This provides support for the notion of ‘sampling methods’ found within research on the response shift (Rapkin and Schwartz, 2004) and indicates that different populations refer to different time frames when making judgements and that this in turn influences the kinds of judgements being made.

In conclusion, the results indicated some marked disparities between the quantitative and free text data with the data often being conflicting and contradictory. The results also provided some insights into how ratings are made and what mechanisms inform and influence this rating process. In particular, the results highlighted the role of participant’s frame of reference and indicate how questions can be interpreted in different ways according to what is salient to the individual. The results also illustrated a role for different methods of comparison with participants in the present study tending to make within subject comparisons by drawing upon their own experiences at different times across their own life

span. Finally, the results also suggested that participants' judgements are founded upon different time frames which influence the type of judgement made and that when individuals have experienced a consistent level of quality of life over a longer period of time, they may habituate rather than sensitise to their standard of living. These results contrast with notions of both a deprivation model and reference group effect which have been used to explore cross cultural differences in the use of Likert scales (Peng, Nisbett and Wong, 1977; Heine et al., 2002). They do, however, find reflection in the notion of a response shift and its mechanisms as reported within research on quality of life (Rapkin and Schwartz, 2004). Further, they indicate that in line with much research exploring the use of Likert scales in the social and behavioural sciences, such measurement tools have their limitations and that data derived from their use should be understood within the broader context of participants' decision making processes. The results also indicate that such limitations may be particularly apparent when exploring groups of individuals who differ vastly in their sense of what is normal for them, particularly in terms of levels of social deprivation.

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Table 1: Demographics by group

Variable	Homeless (n=75)	Students (n=301)	Town (n=72)
Gender Male	n= 53 (70.7%);	n=98 (34.3)	n=30 (41.7%)
Female	n= 21 (29.3%)	n=188 (65.7%)	n=42 (58.3%)
Age <21	n= 6 (8.2%)	n=251 (87.8%)	n=5 (6.9%)
21-30	n=9 (12.3%)	n=29 (10.1%)	n=45 (62.5%)
31-40	n=21 (28.8%)	n=2 (0.7%)	n=16 (22.2%)
41-50	n=18 (24.7%)	n=3 (1.0%)	n=5 (6.9%)
51-60	n =15 (20.5%)	n=1 (0.3%)	n=0
61-70	n=3 (4.1%)	n=0	n=1 (1.4%)
71-80	n =1 (1.4%)	n=0	n=0
Living Stud acc	n=0	n=267 (88.7%)	n=1 (1.4%)
Rented	n=0	n=34 (11.3%)	n=30 (41.7%)
Owned	n=0	n=0	n=14 (19.4%)
Council	n=0	n=0	n=13 (18.1%)
Hotel / hostel	n=18 (24%)	n=0	n=0
Rough sleeper	n=57 (76%)	n=0	n=0
Parents	n=0	n=0	n=14 (19.4%)
Occ Student	n=0	n=301 (100%)	n=0
FT	n=0	n=0	n=49 (68.1%)
PT	n=0	n=0	n=11 (15.3%)
Unemployed	n=75 (100%)	n=0	n=8 (11.1%)
Parent	n=0	n=0	n=4 (5.6%)
Ethnicity White	n=72 (96%)	n=231 (80.8%)	n=45 (62.5%)
Black	n=3 (4%)	n=14 (4.9%)	n=15 (20.8%)
Asian	n=0	n=29 (10.1%)	n=8 (11.1%)
Other	n=0	n=12 (4.2%)	n=4 (5.6%)

Table 2: Differences in mood, health status and satisfaction by group

	Homeless (n=75) Mean/SD (1)	Students (n=301) Mean/SD (2)	Town (n=72) Mean/SD (3)	η^2	F	p	Post hocs
Mood							
Content	3.20 (1.24)	3.40 (1.13)	3.61 (1.41)	0.01	2.15	0.12	NS
Frustrated	2.51 (1.42)	2.20 (1.21)	3.18 (1.52)	0.09	16.82	0.0001	3>1,2
Bored	2.91 (1.49)	2.41 (1.16)	2.94 (1.50)	0.03	7.99	0.0001	3,1>2
Lonely	2.44 (1.52)	2.27 (1.20)	2.92 (1.51)	0.04	7.19	0.001	3>1,2
Friendly	4.08 (0.98)	3.61 (1.01)	3.54 (1.33)	0.02	6.58	0.002	1>2,3
Fed up	2.69 (1.49)	2.30 (1.25)	3.28 (1.55)	0.06	11.91	0.0001	1,3>2
Angry	1.83 (1.33)	1.63 (1.00)	2.53 (1.40)	0.08	18.09	0.0001	3>1,2
Calm	3.72 (1.35)	3.68 (1.14)	3.03 (1.20)	0.05	9.44	0.0001	1,2>3
Health status							
Tired	2.71 (1.50)	3.07 (1.38)	3.44 (1.53)	0.02	4.91	0.008	3>2> 1
Hungry	2.12 (1.29)	2.38 (1.29)	2.36 (1.50)	0.01	1.13	0.32	NS
Thirsty	2.43 (1.42)	2.69 (1.24)	2.36 (1.42)	0.01	2.55	0.08	NS
Healthy	3.24 (1.22)	3.24 (1.14)	2.69 (1.06)	0.02	7.09	0.001	1,2>3
Satisfaction							
Eaten	3.32 (1.33)	3.23 (1.30)	3.81 (1.25)	0.03	5.77	0.003	3>1,2
Sleep	3.81 (1.28)	3.91 (1.16)	3.85 (1.32)	0.00	0.23	0.80	NS
Talk to	3.50 (1.32)	3.98 (1.02)	3.53 (1.37)	0.04	8.28	0.000 1	2>1,3
Treated	3.31 (1.32)	3.67 (1.12)	3.18 (1.33)	0.03	6.42	0.001	2>1,3
Reacted to others	3.89 (1.00)	3.61 (1.01)	3.11 (1.25)	0.06	10.55	0.000 1	1>2> 3
Comfort- able	3.20 (1.24)	3.61 (1.04)	3.50 (1.22)	0.02	4.08	0.018	2>1
Getting help	3.35 (1.46)	3.46 (1.36)	3.10 (1.36)	0.02	2.54	0.08	NS