Construction and validation of the Hong Kong Altruism Index (A-Index)

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A B S T R A C T

The study aimed to construct a valid and culturally sensitive scale to measure altruism in Hong Kong, namely, the Hong Kong Altruism Index (A-Index). Applying the Delphi technique, 11 behavioral items were selected to be included as to indicate altruistic level in Hong Kong (Study 1). Analysis of a community sample of 1104 participants confirmed the A-Index's structure, theoretical dimensions, and construct validity (Study 2). Particularly, it was found that the concept of altruism can be well explained in four dimensions, including volunteering, monetary donation, blood and organ donation, and informal helping. Normative data were also calculated based on the finalized A-Index scoring method. A subsequent analysis showed all items demonstrated good reliability (Study 3). Finally, a focus group study with participants from a diverse social background (Study 4) provided an in-depth review of all items of the A-Index in Hong Kong. The A-Index is found to be psychometrically valid and practically convenient for measuring altruism. Findings highlighted the importance of cross-cultural awareness in the measurement of social phenomenon with a special discussion on the motive of blood and organ donations.

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1. Introduction

Increasing number of studies suggested people who engage in altruistic acts, such as volunteering and donation, is better regarding physical health, psychological wellbeing, and happiness (Aknin et al., 2013; Borgonovi, 2008; Piliavin & Siegl, 2007; Post, 2005; Schwartz et al., 2012). These benefits extend to later life and contribute to the maintenance of life satisfaction and promotion of positive ageing (Kahana, Bhatta, Lovegreen, Kahana, & Midlarsky, 2013). A recent study observed there is increased level of altruism in people who faced adversity, suggesting altruism is used as a coping strategy to alleviate stress and facilitate the healing from adversity or even a form of posttraumatic growth (Frazier et al., 2013; Puvimanasinghe, Denson, Augoustinos, & Somasundaram, 2014). Altruism not only benefits individuals, but it is also seen to be beneficial to the society. Guinot, Chiva, and Mallén (2015) found altruism can reduce relationship conflicts within an organization and subsequently facilitate organization learning capacity, thus improving the competitiveness of the organization in the current challenging economy environment. The benefits of altruism across lifespan and towards the society attract scholars to investigate and advocates to promote altruism.

Although the above-cited literature all refer to and contain the keyword *altruism*, the definitions and measurement of altruism remain unstandardized and ambiguous. For example, Borgonovi (2008), Frazier et al. (2013), and Kahana et al. (2013) all focused on the involvement of volunteering to indicate altruism, whereas Aknin et al. (2013) focused on monetary donation. While Kahana's team measured frequency of volunteering per week, Borgonovi measured the frequency of volunteering in the past 12 months. On the other hand, Frazier et al. used a more structured scale, namely the Community Involvement Inventory (Bono, Snyder, & Duehr, 2015), in measuring volunteering involvement. Similar differences are found when studies measure altruism in a broader context. Schwartz et al. (2012) adopted the 16-item Schwartz Altruism Questionnaire-Adult Version (Schwartz, Keyl, Marcum, & Bode, 2009) as the measure of altruism. The scale includes eight items on general helping (e.g. delay an elevator and hold the door open for a stranger), four items on community connection, two items on helping orientation, and two items on community pressure. On the other hand, Guinot et al. (2015) adopted the altruism subscale from Podsakoff, MacKenzie, Moorman, and Fetter (1990) instrument designed to measure organizational citizenship behavior. The instrument consists of five items (e.g. helps others who have been absent or who have heavy workloads) and respondents are asked to score it on a 5-point scale ranging from strongly disagree to strongly agree.

The wide use of altruism in those studies suggests that they assume a stable and consistent trait of altruism to influence people's involvement or endorse in many different types of behaviors ranging from volunteering, monetary donation, holding the door open for a stranger, to helping others at workplace. In fact, there has been a long debate on whether those behaviors are influenced by the same stable trait of

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altruism or they are specific behaviors in different situations (Rushton, Chrisjohn, & Fekken, 1981). In recent years more and more scholars tend to support the consistency. As a result, the Self-Report Altruism Scale (SRA Scale; Rushton et al., 1981) was developed, including 20 different behaviors and assuming that they all indicate the same altruism personality. The scale has shown to be psychometrically reliable on multiple accounts (Krueger, Hicks, & McGue, 2001). However, Rushton et al. also addressed that the 20 items are very specific and require modification for different social contexts, which demonstrates that the operationalized definition of altruism is still context sensitive.

For example, when the SRA scale was introduced to India, an item on the original scale asking whether the respondent would help push a stranger's car out of the snow was modified into "A stranger's scooter is stuck in a pit. Would you help him/her take it out?" as it is meteorologically improbable there will be snow in India (Khanna, Singh, & Rushton, 1993). Chou (1996) further translated the Hindi version into Chinese as the Chinese Self-report Altruism Scale (C-SAS), assuming the contextual similarity between India and Hong Kong. Although Chou's scale demonstrated acceptable internal reliability and criterion validity, its suitability and sensitivity to be used in today's Hong Kong are questionable. Firstly, he only validated the scale on 247 participants, with 74.4% of them were aged 12–15. The relatively small and young sample prohibited scholars to generalize the results to the population. Secondly, several items listed on the C-SRA scale are outdated to the modern era. For example, for the previously mentioned stuck scooter item, it is not likely to see a scooter stuck in a pit in the highly urbanized Hong Kong. Another example is that one item asking respondents whether they would let a stranger take their place in a queue while getting a train ticket, whereas there are a nearly saturated penetration rates of electronic payment for public transport in Hong Kong. These outdated items put the validity of the C-SRA scale in questions.

Besides the SRA scale, another widely used measurement of general altruism is the World Giving Index (WGI; Charities Aid Foundation, 2016). The WGI includes three questions asking respondents whether they have exhibited three types of behaviors in the past month, namely, volunteering, donation, and informal help. The measurement treats the three types as equally weighted components of altruism. Although the WGI has not been academically validated, it has been frequently cited for international comparison (Helliwell, Layard, & Sachs, 2016). People in Hong Kong pride themselves as one of the top 20 countries in the five-year WGI. However, there is a significant gap between Hong Kong people's participation in volunteering (around 15%) and the other two behaviors (63% donation and 56% informal help). Furthermore, although it is commonly observed across culture that there are positive correlations between WGI and happiness, the model does not fit well in Hong Kong (Aknin, Hamlin, & Dunn, 2012; Aknin et al., 2013; Helliwell et al., 2016). Contrast to its high ranking on WGI, the latest World Happiness Report showed Hong Kong ranked the 75th in happiness, lower than countries that are currently active in war and under threat of extreme terrorism (e.g. Libya; Helliwell et al., 2016). The unusual phenomenon in Hong Kong raises speculation on whether the general measurement of "giving" or altruism is valid in Hong Kong context.

In summary, although scholars tend to consider various types of helping behaviors can be indicating a consistent and stable trait of altruism, there is no validated and up-to-date tool to measure altruism in Chinese context. It is also theoretically unclear whether we can group different types of helping behaviors into the same concept of altruism, or several general types such as the WGI does, and then examine their effects indiscriminately. The gaps may hurdle or mislead our understandings with the effects of altruism. In view of the gaps, the present paper tried to clarify the theoretical construct of altruism in the Hong Kong context, and also establish a theoretically valid, culturally sensitive, and easily administrated measurement of altruism, i.e., the Hong Kong Altruism Index (A-Index).

2. Overview of the studies

The present paper included a series of studies conducted in a 21-month period from April 2014 to December 2015. Study 1 reflected local academia and professionals' views on the theoretical construct and operationalization of altruism. Based on Study 1, a tentative A-Index was proposed. Study 2 verified the theoretical construct and validity of the proposed A-Index on a random community sample of 1104 Hong Kong residents. Based on Study 2, the A-Index was finalized and normative results of the scale in Hong Kong population were also calculated based on the survey. Study 3 confirmed the test-retest reliability of A-Index. Finally, Study 4 further explored the transferable validity of the A-Index by a qualitative study on participants from diverse socio-cultural background. All studies have received ethical approval from the University's Human Research Ethics Committee.

3. Study 1 – experts' construct

3.1. Objectives

Study 1 aimed to propose a tentative A-Index for further examination. Behavioral items that local experts think are suitable for indicating altruism, time frame for each item, and theoretical dimensions of those items would be derived from this study.

3.2. Method

An extensive literature review was conducted by the first author on both local and non-local existing scales available for measuring altruism. After removing those duplicates, a pool of 28 behaviors was eventually collected. The major sources include the Altruistic Personality Scale (Rushton et al., 1981), the European Commission Eurobarometer Survey on Poverty and Social Exclusion 2009 (European Commission, 2010), and the Survey on Volunteering in Hong Kong 2009 (Agency for Volunteer Service, 2011).

All 28 items were then reviewed and determined its accountability by experts in the field using the Delphi technique. The Delphi technique was developed by Dalkey and Helmer (1963) at the Rand Corporation. It is characterized by a panel expert review and feedback process which allow selected experts to provide their opinions anonymously and develop consensus with the topic concerned (Hsu & Sandford, 2007). Four local experts, including three researchers in the field and one experienced NGO operator, were invited to review all shortlisted behaviors and assess whether or not each item is suitable for measuring altruism in Hong Kong. The panelists were asked to rate independently based on two criteria: (1) the behavior must fit the academic definition of altruism, referring to "any behavior that is designed to increase another person's welfare, and particularly those actions that do not seem to provide a direct reward to the person who performs them" (Batson, Ahmad, & Stocks, 2011; Dovidio, Piliavin, Schroeder, & Penner, 2006; Penner, Dovidio, Piliavin, & Schroeder, 2005); and (2) the behavior should be likely encountered by most Hong Kong people. In addition, the panelists were invited to suggest the time frame for each item and whether we can group some items into one theoretical dimension. The behavior would be included if all four experts unanimously deemed such behavior as suitable. After the first round of review, the panelist achieved consensus on including nine items and excluding five items. They remained disagreement on the other 14 items. In addition, the panelists further proposed three additional items to be included. The panelists were requested to write down notes of why they think an item should be excluded or included. The notes were shared with other panelists in the second round to allow them to revise their judgements. The panel achieved consensus on a list of 11 items after the second round of review.

3.3. Results

Eleven items were deemed by the experts as suitable indicators of altruism in the context of Hong Kong, including (1) volunteering for a charity, (2) volunteering organized by school/company, (3) monetary donation to a charity, (4) good or clothes donation to a charity, (5) blood donation, (6) sign organs/bone marrow donation form, (7) give money directly to a stranger, (8) give food or clothes directly to the poor, (9) offering seat on a public vehicle, (10) helping neighbors taking care of people or pets, and (11) helping someone who you are not close with emotional problems. Item 6 was added by the panelists during the first round of review.

Two competing theories regarding the dimension of the items have been proposed by the panelists. A three-dimension theory suggested that all items fall into either one of the three categories, namely *formal volunteering* (*Items 1 and 2*), *formal donation* (*Items 3 to 6*), and *informal helping* (*Items 7 to 11*). This is consistent with the dimensions utilized in the WGI. The four-dimension theory, on the other hand, suggested that these items should rather fall into four categories with *blood and organ donation* as the fourth. According to previous research on human tissue donation, blood donation is said to be uniquely distinctive from volunteering and money donation not only because it is the least common out of the three, but also due to the factors motivating blood donors are different from the other type of donations (Lee, Piliavin, & Call, 1999). The study described role identity, as developed by "internalization of a moral imperative", has the greatest influence on motivating people to donate blood while the expectation of others and personal norms are greater at influencing people to donate money or their time. This suggested human tissue donation is beyond a simple act of altruism but more of a moral obligation.

The most suitable time frame used for the items were also discussed by the panelists. The panelists suggested three options of time frame: one month, one year, or lifetime. It was agreed that the time frame used must take consideration of the recall accuracy but also correspond to the odds of which an individual will exhibit the behavior within that time frame. Therefore, the time frame of the scale must be considered by individual items.

Given that the panelists could not achieve consensus on theoretical dimensions and time frame setting, we remained them as empirical research questions for further examination. As a result, we generated a tentative A-Index, which included all of the 11 proposed items and three proposed time frames.

4. Study 2: exploratory and confirmatory factor analysis

4.1. Objective

Study 2 aimed to find the optimal time frame setting and empirical confirmation for A-Index's theoretical dimensions. In addition, after finalizing the A-Index, its normative results on the general Hong Kong population and relationships with the respondents' life satisfaction were calculated.

4.2. Method

4.2.1. Participants

Data were collected from a random sample of 1104 Hong Kong residents who were aged 15 to 91 ($M_{age} = 48.4$, $SD_{age} = 18.5$; female = 653) through telephone interview during April to June 2014. The effective response rate is 55.4% (95% CI: 53.2–57.6).

4.2.2. Procedures

The random sample was recruited through a two-stage process. First, random samples were selected from all telephone owning household in Hong Kong using the Computer-assisted telephone interview system. Three attempts were made for each randomly selected

telephone numbers before moving to the next number. Secondly, when telephone contact was successfully established with a target household, one of the household members aged 15 or above would be invited to this survey. If more than one qualified respondents were available, the one who has his/her birthday next would be selected. Respondents were asked whether they have exhibited the 11 altruistic behaviors under the three time frames. Two addition measures were also given to them to rate their self-reported altruism level and life satisfaction. Self-reported altruism level is measured by rating how helpful they think they are on a 7-point scale ranging from [1] never helpful at all to [7] always helpful. Whereas life satisfaction is measured by four questions to rate their level of satisfaction with current standard of living, health, family, and job on a 5-popint scale ranging from [1] very dissatisfy to [5] very satisfy. Additional demographics details, including sex, age, education levels, economic activity, religious beliefs, and monthly household income were also collected. The A-Index score was calculated by adding the number of items the respondent displayed under the designated time frame in the respective sub-scales.

4.2.3. Statistical analysis

Firstly, three dummy binary variables were created for each altruistic behavior, each indicating whether it has been exhibited [1] or not [0] within three different time frames, i.e. within the past month, within the past 12 months, and in a lifetime. The three dummy variables were inevitability highly correlated due to the overlapping nature of time frame. The purpose of the first step was to select which time frame of each item is the best for the construct of the scale. Exploratory factor analysis (EFA) was used, loading all 33 dummy variables onto one factor. As the assumption of multi-normality of variables was obviously not valid, the principal-axis factoring method was specified. For each of the 11 altruistic behaviors, the time frame obtained the largest factor loading among the three dummy variables was selected for further analysis.

Secondly, based on the optimal time frame of each of the 11 altruistic behaviors selected from the first step, confirmatory factor analysis (CFA) was performed to evaluate the theoretical dimensions of A-index. As the items were binary-coded, the CFA model was fitted using polychoric correlations and weighted least squares estimation with mean and variance adjusted (WLSMV; Li, 2016). A number of fit indices, namely root mean square error of approximation (RMSEA), weighted root mean square residual (WRMR), non-normed fit index (NNFI), and comparative fit index (CFI), were used to assess the fitness of each model. Chi-square statistics was also provided but not used for model assessment. Because of its high sensitivity to sample size, it could not provide a reasonable assessment of model fit (Bentler & Bonett, 1980). WRMR was used instead of standardized root mean square residual (SRMR) as the models involved categorical variables. A model obtaining CFI and NNFI > 0.95, RMSEA < 0.06 (Hu & Bentler, 1999), and WRMR < 1 (Yu, 2002) is considered as a good model fit.

The final construct derived from CFA was correlated with measurements of life satisfaction and self-reported altruism using Pearson's rank correlation coefficient. The reliability for the tentative and the final construct of the scale were calculated. Lastly, cross-tabulation descriptive statistics on the calculated A-Index score, stratified by age group and gender, were also derived from the data.

4.3. Results

EFA obtained the largest factor loading in the dummy variable indicating one month (0.371) was the best time frame to measure Item 9 (offering a seat on a public vehicle). Lifetime was the best time frame for Item 5 (blood donation) and Item 6 (sign organs/bone marrow donation form), while the remaining eight items were all categorized to one year. Table 1 provides the full results for this EFA. Although most of the existing scales use unified time frame to measure different types of behaviors, we argued the use of different time frame for each

Table 1
Results for exploratory factor analysis (EFA).

Items	Within 1 month	Within 1 year	Lifetime
(1) Volunteering for a charity	0.374	0.595[a]	0.516
(2) Volunteering organized by school/company	0.409	0.577[a]	0.475
(3) Monetary donation to a charity	0.315	0.404[a]	0.249
(4) Good or clothes donation to a charity	0.284	0.291[a]	0.219
(5) Blood donation	0.134	0.212	0.254[a]
(6) Sign organs/bone marrow donation form	− 0.013	0.097	0.253[a]
(7) Give money directly to a stranger	0.269	0.349[a]	0.274
(8) Give food or clothes directly to the poor	0.265	0.467[a]	0.426
(9) Offering seat on a public vehicle	0.371[a]	0.365	0.250
(10) Helping neighbors taking care of people or pets	0.240	0.358[a]	0.330
(11) Helping someone who you are not close with emotional problems	0.431	0.588[a]	0.558

[a] Selected for further analysis in confirmatory factor analysis (CFA).

item can better acknowledge the characteristics and nature of the altruistic behavior. This idea was supported by a review of the optimal recall period in self-measured scales, which concluded that there is no single recall time frame will work for all phenomena (Stull, Leidy, Parasuraman, & Chassany, 2009).

Table 2 summarizes all the models tested by CFA and their associated fit indices. A total of four models were tested. Model 1 is a one-factor model which loads all 11 items onto one factor. This model proposes that all altruistic behaviors can be simply combined to one general construct, termed as *altruism*. Model 2 is a three-factor model based on the three-dimension theory as proposed by the panelists during Study 1. Items 1 and 2 belong to a factor reflecting *formal volunteering*, Items 3 to 6 belong to another latent construct reflecting *formal donation*, while Items 7 to 11 belong to another latent construct termed as *informal helping*. Model 3 is based on the four-dimension theory as argued by some panelists during Study 1. It includes the same factors of formal volunteering and informal helping as the second model, but separates Items 5 and 6 from *formal donation* and loaded into a fourth factor, termed *blood and organ donation*.

Model 1 had a poor fit as indicated by three out of four fit indices – CFI = 0.883, NNFI = 0.886, RMSEA = 0.059, and WRMR = 1.593. Model 2 greatly improved yet still failed to meet the cut-offs of a good fit. Model 3, a four-factor model with an additional factor composed of Item 5 and 6, obtained a moderate fit. Its CFI, NNFI, and RMSEA passed the cut-off criteria but its WRMR remained unsatisfactory at 1.074. This indicated that a four-factor model performed better in explaining the latent construct of altruistic behaviors than both one-factor and three-factor models.

We observed that in Models 1–3 the standardized factor loading of Item 4 (i.e. goods or clothes donation to a charity) were consistently the lowest (0.273–0.345). A modified model, Model 3a, was therefore constructed based on Model 3 with this item removed. As the two models were not nested, Bayesian information criteria (BIC) were computed using robust maximum likelihood model for the purpose of model comparison. The fit indices CFI, NNFI and RMSEA improved

further while WRMR dropped below the cut-off at 0.897, indicating a good fit of the model to the data. The BIC also decreased greatly from 13,684 to 12,207. Two additional models were tested by removing this item from Model 1 and Model 2. Their fit indices also improved greatly but still did not meet the criteria of a good fit except RMSEA. Besides great improvement in the goodness of fit of the models after removing Item 4, participants from subsequent qualitative study also addressed the lack of genuine altruism in Item 4 (see details in Study 4). Therefore, Item 4 was excluded from the A-Index.

In Model 3a, the correlations among factors ranged from 0.335 to 0.834. The high correlation between some factors suggested the possibility of a higher-order factor. Therefore, Model 3a was further modified to a second-order factor model as Model 4. All first-order factors are loaded into a single second-order latent variable, suggesting the existence of a more general and universal factor at a higher order in explaining the covariations among different sorts of altruistic behaviors at the first order.

All four fit indices of Model 4 reflected a good fit to the data and had similar values to its first-order counterpart Model 3a. Given that the goodness of fit is more or less the same, a higher-order model is generally superior as it provides a more parsimonious factor structure (Chen, Sousa, & West, 2005). All first-order factors were statistically significantly loaded onto a single second-order construct (standardized factor loadings = 0.462–0.975, $p < 0.001$). Fig. 1 shows the factor structure and the standardized factor loadings of Model 4.

Normative data for each dimension and total score, as stratified by age group and gender, are presented in Table 3. To improve the representativeness of the study, data for the total score have been weighted according to the age and gender distribution of the Hong Kong population, as reported in mid-2014 Census population Estimate (Census and Statistics Department, 2016). Statistically significant difference was not observed between the two genders, $t(1099) = -1.661$, $p = 0.097$, but was found between the four age groups, $F(3, 1094) = 39.022$, $p < 0.001$. The mean total score of A-Index decreases as the age group increased, i.e. age 15–34 scored a mean of 4.398 whereas age 65 + scored a mean of 2.538. Post hoc analysis with Turkey HSD test indicated the age difference is statistically significant. In terms of reliability, the whole scale reliability, as measured by omega coefficient, was found to be 0.783 for both the 11-item and the 10-item constructs. Moreover, the correlations between the total A-Index score and self-reported altruism was 0.233 ($p < 0.001$), which suggest moderate evidence of convergent validity. The correlations between the total A-Index score and life satisfactory was 0.120 ($p = 0.002$), which suggests some prediction power on the latter.

5. Study 3: scale reliability

5.1. Objective

Study 3 aimed to find out the test-retest reliability for each item on the A-Index.

Table 2
Fit indices for CFA models of the scale (best fitting model in bold).

Model		CFI	NNFI	RMSEA	WRMR	χ^2 (df)	BIC[a]
1	1 factor	0.883	0.886	0.059	1.593	190.677 (39)[*]	13,739.243
2	3 factors	0.929	0.925	0.048	1.306	128.335 (36)[*]	13,698.481
3	4 factors	0.956	0.951	0.039	1.074	90.397 (34)[*]	13,684.402
1a	1 factor, item 4 deleted	0.913	0.910	0.056	1.480	139.570 (31)[*]	12,246.307
2a	3 factors, item 4 deleted	0.947	0.942	0.045	1.191	94.388 (29)[*]	12,218.681
3a	4 factors, item 4 deleted	0.978	0.974	0.030	0.897	54.428 (27)[*]	12,206.892
4	**Model 3a with 2nd order factor**	**0.979**	**0.977**	**0.028**	**0.905**	**54.638 (29)[*]**	**12,193.185**

[*] $p < 0.01$.
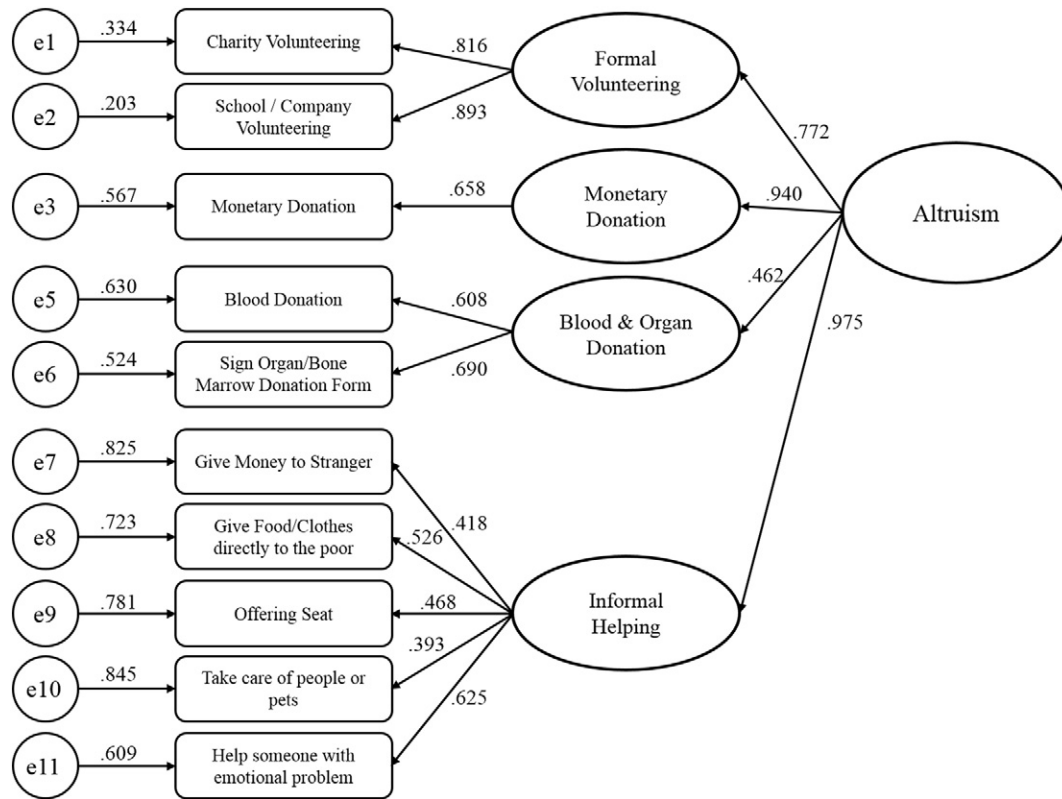[a] BIC were computed using robust maximum likelihood estimator.

Fig. 1. CFA factor structure and the standardized factor loadings.

5.2. Method

5.2.1. Participants

Fifty-eight university students (female = 44, M_{age} = 18.9, SD_{age} = 1.01) were recruited from a university core course class.

5.2.2. Procedures

The A-Index was administered twice, with a two weeks' time interval between the two testing, to participants during their lecture. All participants were given full consent prior to the start of the study.

5.3. Results

Data were analyzed with intra-class correlation coefficient (ICC). Two-way mix model was adopted and the ICC was computed for each item as well as each dimension of the A-Index. Results for each of the items are shown in Table 4. All results showed

Table 3
Normative data of A-Index as grouped by age and gender.

	Volunteering		Monetary donation		Blood and organ donation		Informal helping		Total	
	M	SD	M	SD	M	SD	M	SD	M	SD
Age Group 15–34 (n = 281)										
Male	0.850	0.881	0.879	0.328	0.650	0.678	1.743	1.140	4.121	1.958
Female	1.07	0.896	0.893	0.310	0.650	0.739	2.029	1.106	4.629	1.972
Age group 35–54 (n = 366)										
Male	0.593	0.765	0.788	0.410	0.898	0.755	1.703	1.303	3.983	2.306
Female	0.660	0.805	0.810	0.393	0.530	0.691	2.024	1.297	4.024	2.164
Age group 55–64 (n = 213)										
Male	0.338	0.556	0.770	0.424	0.608	0.658	1.541	1.241	3.257	1.791
Female	0.370	0.652	0.761	0.428	0.399	0.634	1.601	1.247	3.130	1.985
Age group 65+ (n = 238)										
Male	0.276	0.584	0.612	0.489	0.319	0.537	1.216	1.193	2.422	1.861
Female	0.295	0.541	0.705	0.458	0.205	0.480	1.434	1.298	2.639	1.872
Total (Weighted normative data as grouped by age group)										
Male	0.571	0.772	0.782	0.413	0.674	0.709	1.604	1.236	3.631	2.132
Female	0.676	0.826	0.810	0.392	0.494	0.684	1.866	1.256	3.846	2.153
Total	0.628	0.803	0.798	0.402	0.576	0.701	1.746	1.253	3.748	2.145

Table 4
Results for intraclass correlation coefficient.

Items	ICC[a]	F	p
(1) Volunteering for a charity	0.851	0.047	0.829
(2) Volunteering organized by school/company	0.807	0.179	0.674
(3) Monetary donation to a charity	0.862	0.036	0.849
(4) Good or clothes donation to a charity	0.802	2.37	0.129
(5) Blood donation	0.981	2.04	0.159
(6) Sign organs/bone marrow donation form	0.782	0.396	0.532
(7) Give money directly to a stranger	0.771	0.329	0.568
(8) Give food or clothes directly to the poor	0.552	0.363	0.549
(9) Offering seat on a public vehicle	0.656	0.387	0.536
(10) Helping neighbors taking care of people or pets	0.802	0.360	0.551
(11) Helping someone who you are not close with emotional problems	0.821	1.00	0.322
A-Index: formal volunteering	0.873	0.047	0.829
A-Index: formal donation	0.782	0.396	0.532
A-Index: blood & organ donation	0.973	0.000	1.00
A-Index: informal helping	0.704	0.219	0.641
A-Index total	0.864	0.088	0.768

[a] Two-way mixed model, average measure.

marginal to excellent reliability, well above the acceptable reliability of 0.70 criterion for research purpose (Numnnally & Bernstein, 1994).

6. Study 4: focus group study

6.1. Objective

Study 4 aimed to collect comments to the A-Index from Hong Kong residents with diverse background, some of whom may have been under-represented in the random sample telephone survey. Although the survey in Study 2 was prepared in three common languages in Hong Kong, i.e. Cantonese, English, and Mandarin, all respondents have chosen to respond in Cantonese. According to the latest Census in 2011, 1.37% of Hong Kong population are newly immigrants from mainland China, and 6.86% are originally from foreign countries such as British, Filipino, and American (Census and Statistics Department, 2012). Although those people from diverse background are a relatively small proportion of the population, they are important members of the multicultural city. A qualitative study can target at those under-represented groups and gain more insights from them.

6.2. Method

6.2.1. Participants

Six sessions of focus group were held during November to December 2015. We adopted the maximum variation sampling method to compliment the sampling weakness in Study 2. Every two groups were held in Cantonese, Mandarin, and English with one for working people and the other one for non-working people. We have recruited a total of 35 Hong Kong residents through posters at the university campus and bulk email via our networks and NGO partners. Modest compensation was provided to the participants. The vast majority of the Mandarin speaking participants are originally from mainland China, whereas the English-speaking participants are originally from countries such as India, Malaysia, US, Canada, and the UK. They are all residents in Hong Kong for longer than six months.

6.2.2. Procedures

Each focus group session lasted for roughly two hours. An experienced facilitator used probing questions to collect participant's comments on the items while two assistant moderators were on scene for notes taking and observation throughout the discussion. The conversations were tape-recorded while participants were reminded not to identify themselves during recording.

6.2.3. Data analysis

The recordings have been transcribed verbatim and coded independently by the first author, the third author, and a PhD candidate followed by cross-checking. The data corpus was subjected to thematic content analysis (Green & Thorogood, 2004), where the items of A-Index were adopted as basic themes and were subjected to modification as new topics may be derived from the data by abductive reasoning. Disagreements among the coders were solved by close communications. Data were saturated after two rounds of coding and cross-checking.

6.3. Results

Results generally supported the constructs of the A-Index. Participants across the groups consistently agreed that most of the items in A-Index are suitable for indicating altruism. Particularly, they reported the greatest consensus on considering *donated money to charity* and *have helped someone with emotional problem* as altruistic behaviors. However, they showed strong disagreement with the item of *giving food or clothes to charity* and some debates on the nature of blood and organ donation.

Some participants argued that donating goods is not an authentic altruism. People see this behavior as more motivated by disposing of waste rather than helping others. For example, one male participant from the Cantonese group said:

> *What I consider donating goods is I don't want the stuff and not necessary helping others. Take donating clothes as an example: I have some clothes that don't fit me anymore but it looks as if brand new. So why not donate it to The Salvation Army and let them deal with the clothes for me. I can kill two birds with one stone.*

The point is in line with some of the previous literature in distribution management showing clothing were mostly taken to a charity based on convenience and clothes donation made up to 70% of the total donation to charity stores (Birtwistle & Moore, 2007). This is also consistent with our CFA result that reported low factor loadings on the item, which further warrants us to remove this item from the A-Index.

The discussions around the topic of blood and organ donation also provided interesting insights into our constructed scale. Some participants have mentioned repeatedly they see blood or organs donations as more altruistic than simply donating money or goods because the blood or organ can be used for fully helping others. Quoted from our participants:

> *I feel there are more meaning to donating blood as you can really help the patients … and even more for donating organs as you are literally extending life. That is something money cannot buy.*
>
> [~Male, Cantonese Group, Student]

> *Donating blood in a way is more altruistic than donating money. Because donating money you depend on how it's spent, how that charity decided to spend that money … [but with donating blood], your donation is 100% going to, directly to, wherever in needs.*
>
> [~Male, English Group, Full-time Employed]

On the other hand, some participants considered blood and organ donation as the easiest way to help others, because a person can lose nothing by donating blood or organ.

> *In terms of donating organs, if I'm dying and someone tells me my organ matches theirs, I will donate them since it is no use to me anymore.*
>
> [~Male, Mandarin Group, Student]

In addition, some participants also pointed out the extra concerns they would consider when donating human tissue, especially when donating organs. One of these concerns is the consensus within the family. They welcome the idea of donating organs themselves but remain

reluctant due to objections within the family. This pattern of thoughts is predominantly seen in the Cantonese and Mandarin groups and much less in the English groups.

> *I want to say if it is me, if my family don't disagree, I think I am very willing to do so [donate organ] … but it will be another matter if my family disagree. Sometimes, I'd first have to consider how my family feel about my decision.*
>
> [~*Female, Mandarin Group, Full-time Employed*]

Besides the items included in the A-Index, we observed a frequent mention of the use of internet and cyber technology for helping others by a number of younger participants across the groups. This can be further differentiated into two types of behaviors: (1) online sharing of knowledge, experience, or resources; and (2) utilizing online medium to initiate or promote helping behaviors. For example, one participant stated:

> *People on overseas study forum share lots of detailed everyday life experience, visa issue, and their experience in seeking education … I think the person writing all these is pretty awesome. It is kind of his own experience and whether to share it or not is entirely his decision. His willingness to share is already a process to help others.*
>
> [~*Male, Mandarin Group, Student*]

Utilization of online medium to promote altruism, on the other hand, is even more often seen nowadays. Participants across all groups listed out several examples in recent years:

> *You always find it on the internet the blood inventories are running low on a certain blood type or apheresis and urgently need donation for replenishment. Then people on the internet all responded and rushed to the blood station.*
>
> [~*Female, Cantonese, Full-time Employed*]

> *I remember there was a very popular game…called the Ice Bucket Challenge. That one went viral on the internet and the ALS Association ended up with lots of donation.*
>
> [~*Male, Cantonese, Full-time Employed*]

An older lady in one of the groups indicated that Hong Kong people are less altruistic now compared to when she was young. She justified her statement by saying that there are little interactions in the community as people are getting indifferent to others. She further shared that she barely talks to her neighbors or even receive a smile from her neighbors. Following her sharing, one young man indicated a different view:

> *I don't actually find our community is getting more detached. In fact, there are still a lot of platforms to help others. For example, if you have a problem need to be solved, you could go on forums and there will be many people, even unknown to you, trying to help you. The same thing for Facebook on their wide range of groups, such as district-wise or estate-wise Facebook groups. I often see lots of kind people on the group helping others with lost and found or lending and borrowing…*
>
> [~*Male, Cantonese, Student*]

The different perceptions of the two participants exemplified how the Internet affected people's perception and interpretation of altruism. The younger generation is extending their act of altruism to the internet, speeding up the spread of helping information and developing a new way of helping others by sharing. It suggests us to add one or two more items about internet-based helping behaviors to more sensitively measure young people's altruism level in the future.

7. Discussion

The paper presented how we constructed and validated a measurement of altruism in Hong Kong. A checklist of 10 items was finalized,

which can be quickly completed and conveniently administrated in community survey. The finalized A-Index demonstrated satisfactory reliability and construct validity, verified by experts' opinions, community random sample's self-rated altruism, and representatives of diverse sub-groups.

Our series of studies consistently supported that there is a stable trait of altruism underlying different specific helping behaviors. We can consider the 10 behaviors in the A-Index as a whole reflection of altruism or group them into four dimensions to compare their different patterns and effects. It is noteworthy that lay people tend to interpret altruism by motivation more than outcome. For example, donating food or clothes to charity, which was considered as altruistic by experts, was deemed as not altruistic by the community survey. Lay participants of the focus group study further explained that the reason to exclude this behavior is based on the motivation – it is for helping oneself more than helping others, although the outcome will benefit others. The theoretical consistency of different helping behaviors supports future policies and social advocacies to promote altruism as a whole so that diverse helping behavior all can be boosted.

Although the 3-dimension measurement of altruism has been widely used for polling and academic research (Charities Aid Foundation, 2016), the present study provides new evidence to support four distinct dimensions in altruism, namely (1) *volunteering*, (2) *monetary donation*, (3) *blood and organ donation*, and (4) *informal helping*. Our findings are consistent with some literature on the distinction between blood and organ donation and another form of donations. However, the reasons why they are different were reported differently by our focus group participants, compared to previous literature that argued blood and organs donation are motivated by solidarity and personal moral norms (Bednall & Bove, 2011; Saunders, 2012). Study 2 noted that the correlation between altruism and the dimension of blood and organ donation is not as strong as the other three dimensions, which suggests that blood and organ donation might be affected by other traits or factors in addition to altruism. Study 4 further showed that people held different opinions on the nature of blood and organ donation. Future studies can conduct more in-depth investigations on what cultural perspectives should be taken into consideration when promoting blood and organ donation.

Generation differences were observed in normative data and the focus group study. Older generation seems to be less altruistic than the younger generation when comparing their total scores on the A-Index. However, with a closer examination, we found greater differences in scores of *volunteering* and *blood and organ donation*, while there is not much difference in terms of monetary donation and informal helping. The findings echo many existing literature on generation differences in volunteering, where young people participate in volunteering more frequently (Burns, Reid, Toncar, Fawcett, & Anderson, 2006; Morrow-Howell, 2010). For blood and organ donation, it is likely that medical and physical conditions in elderlies hinder their participation in blood donation. Previous literature also pointed out typical characteristics of blood donor is often young people possesses a higher level of education (Tscheulin & Lindenmeier, 2005). In addition, traditional thinking of reserving a full body after death in Chinese culture may also prevent elderlies to participate in organ donation, as indicated by some of the focus group participants.

Younger generations' experiences of online altruism, as identified in the focus group study, deserves more studies. Wallace (2001) stated that internet offers many opportunities for individuals to act altruistically, where there are a wide variety of ways to approach digital altruism, such as collective contribution on open-source content and sharing of expertise created for the public good, e.g. the development of Linux and donating to integrated social networking site with advertisement of various charities. Hong Kong has a household broadband penetration rate of 85.3% and mobile subscriber penetration rate of 230.3% (as on August 2016; Digital 21 Strategy, 2016). Promotion of altruistic acts can easily go viral through social media and often resonated promising outcome.

Although the A-Index is primarily developed for the Hong Kong context, the focus group study with participants from diverse background suggests that the scale has potential validity to other societies. Hong Kong is an economically well-developed area with exceptionally high population density. As a former colony of the British Empire, Hong Kong has a unique blend of both Western and traditional Chinese cultural norms. Several regions in Southeast Asia, e.g. Macau and Singapore, also mirror Hong Kong due to their similarities in history. Therefore, we predict the A-Index will also as a better choice to use to measure altruism in these countries with similar cultural history and background.

Some limitations of the study should be noted. Given the lack of a well developed measurement of altruism or prosocial behaviors, we did not manage to include other similar measurements into the study to examine A-Index's convergent validity. In addition, as generational differences are noted in Study 3 and Study 4, A-Index is subject to be further modified to provide a more sensitive measurement of youth and elderly's altruism level.

To the best of our knowledge, the A-Index is the first scale specifically constructed for measuring altruism in the context of Hong Kong. The study also contributes to clarifying the theoretical construct of altruism in the Hong Kong context, which may also be applicable to other developed Chinese societies. Validation on a large community sample and adopted the in-depth focus groups methodology provided concrete evidence for the validity and usefulness of the A-Index. We are confident this scale can serve to better measure and explain altruism in Hong Kong and other culturally similar societies.

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References

Agency for Volunteer Service (2011). *Survey on volunteering in Hong Kong 2009.* (Retrieved from Hong Kong).

Aknin, Hamlin, J. K., & Dunn, E. W. (2012). Giving leads to happiness in young children. *PloS One*, 7(6), 1. http://dx.doi.org/10.1371/journal.pone.0039211.

Aknin, L. R., Barrington-Leigh, C. P., Dunn, E. W., Helliwell, J. F., Burns, J., Biswas-Diener, R., ... Norton, M. I. (2013). Prosocial spending and well-being: Cross-cultural evidence for a psychological universal. *Journal of Personality and Social Psychology*, 104(4), 635.

Batson, C., Ahmad, N., & Stocks, E. L. (2011). Four forms of prosaically motivation: Egoism, altruism, collectivism, and principlism. In D. Dunning, & D. Dunning (Eds.), *Social motivation* (pp. 103–126). New York, NY: Psychology Press.

Bednall, T. C., & Bove, L. L. (2011). Donating blood: A meta-analytic review of self-reported motivators and deterrents. *Transfusion Medicine Reviews*, 25(4), 317–334. http://dx.doi.org/10.1016/j.tmrv.2011.04.005.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588–606. http://dx.doi.org/10.1037/0033-2909.88.3.588.

Birtwistle, G., & Moore, C. M. (2007). Fashion clothing - where does it all end up? *International Journal of Retail & Distribution Management*, 35(3), 210–216. http://dx.doi.org/10.1108/09590550710735068.

Bono, J. E., Snyder, M., & Duehr, E. E. (2015). *Types of community involvement: The role of personality and motives.* (Paper presented at the Annual meeting of the Society for Personality and Social Psychology, New Orleans, LA).

Borgonovi, F. (2008). Doing well by doing good. The relationship between formal volunteering and self-reported health and happiness. *Social Science & Medicine*, 66(11), 2321–2334. http://dx.doi.org/10.1016/j.socscimed.2008.01.011.

Burns, D. J., Reid, J. S., Toncar, M., Fawcett, J., & Anderson, C. (2006). Motivations to volunteer: The role of altruism. *International Review on Public and Non-Profit Marketing*, 3(2), 79–91. http://dx.doi.org/10.1007/BF02893621.

Census and Statistics Department (2012). *2011 population census main report: Volume I.*

Census and Statistics Department (2016). Population by age group and sex. Population estimates. Retrieved from https://goo.gl/BHhPvl

Charities Aid Foundation (2016). *CAF world giving index 2016.*

Chen, F. F., Sousa, K. H., & West, S. G. (2005). Teacher's corner: Testing measurement invariance of second-order factor models. *Structural Equation Modeling*, 12(3), 471–492.

Chou, K. -L. (1996). The Rushton, Chrisjohn and Fekken self-report altruism scale: A Chinese translation. *Personality and Individual Differences*, 21(2), 297–298. http://dx.doi.org/10.1016/0191-8869(96)00040-2.

Dalkey, N., & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science*, 9(3), 458.

Digital 21 Strategy (2016). Measurement of ICT development under the 2008 digital 21 strategy. Statistics and figures. Retrieved from http://www.digital21.gov.hk/eng/statistics/stat.htm

Dovidio, J. F., Piliavin, J. A., Schroeder, D. A., & Penner, L. A. (2006). *The social psychology of prosocial behavior.* New Jersey, NJ: Lawrence Eribaum.

European Commission (2010). *Poverty and social exclusion report.*

Frazier, P., Greer, C., Gabrielsen, S., Tennen, H., Park, C., & Tomich, P. (2013). The relation between trauma exposure and prosocial behavior. *Psychological Trauma: Theory, Research, Practice, and Policy*, 5(3), 286–294. http://dx.doi.org/10.1037/a0027255.

Green, J., & Thorogood, N. (2004). Analysing qualitative data. In D. Silverman (Ed.), *Qualitative methods for health research* (pp. 173–200). London: Sage Publications.

Guinot, J., Chiva, R., & Mallén, F. (2015). The effects of altruism and relationship conflict on organizational learning. *International Journal of Conflict Management*, 26(1), 85–112. http://dx.doi.org/10.1108/IJCMA-12-2013-0100.

Helliwell, J., Layard, R., & Sachs, J. (2016). World happiness report 2016, update (Vol. 1). Retrieved from New York http://worldhappiness.report/

Hsu, C. -C., & Sandford, B. A. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research & Evaluation*, 12(10), 1–8.

Hu, L. -T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. http://dx.doi.org/10.1080/10705519909540118.

Kahana, E., Bhatta, T., Lovegreen, L. D., Kahana, B., & Midlarsky, E. (2013). Altruism, helping, and volunteering: Pathways to well-being in late life. *Journal of Aging and Health*, 25(1), 159–187. http://dx.doi.org/10.1177/0898264312469665.

Khanna, R., Singh, P., & Rushton, J. P. (1993). Development of the Hindi version of a Self-Report Altruism Scale. *Personality and Individual Differences*, 14(1), 267–270. http://dx.doi.org/10.1016/0191-8869(93)90202-E.

Krueger, R. F., Hicks, B. M., & McGue, M. (2001). Altruism and antisocial behavior: Independent tendencies, unique personality correlates, distinct etiologies. *Psychological Science*, 12(5), 397–402. http://dx.doi.org/10.1111/1467-9280.00373.

Lee, L., Piliavin, J. A., & Call, V. R. A. (1999). Giving time, money, and blood: Similarities and differences. *Social Psychology Quarterly*, 62(3), 276–290. http://dx.doi.org/10.2307/2695864.

Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods*, 48(3), 936–949. http://dx.doi.org/10.3758/s13428-015-0619-7.

Morrow-Howell, N. (2010). Volunteering in later life: research frontiers. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 65(4), 461–469. http://dx.doi.org/10.1093/geronb/gbq024.

Numnnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

Penner, L. A., Dovidio, J. F., Piliavin, J. A., & Schroeder, D. A. (2005). Prosocial behavior: Multilevel perspectives. *Annual Review of Psychology*, 56, 365–392.

Piliavin, J. A., & Siegl, E. (2007). Health benefits of volunteering in the Wisconsin longitudinal study. *Journal of Health and Social Behavior*, 48(4), 450–464. http://dx.doi.org/10.1177/002214650704800408.

Podsakoff, P. M., MacKenzie, S. B., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *The Leadership Quarterly*, 1(2), 107–142.

Post, S. G. (2005). Altruism, happiness, and health: It's good to be good. *International Journal of Behavioral Medicine*, 12(2), 66–77.

Puvimanasinghe, T., Denson, L. A., Augoustinos, M., & Somasundaram, D. (2014). "Giving back to society what society gave us": Altruism, coping, and meaning making by two refugee communities in South Australia. *Australian Psychologist*, 49(5), 313–321. http://dx.doi.org/10.1111/ap.12065.

Rushton, Chrisjohn, & Fekken (1981). The altruistic personality and the self-report altruism scale. *Personality and Individual Differences*, 2(4), 293–302. http://dx.doi.org/10.1016/0191-8869(81)90084-2.

Saunders, B. (2012). Altruism or solidarity? The motives for organ donation and two proposals. *Bioethics*, 26(7), 376–381. http://dx.doi.org/10.1111/j.1467-8519.2012.01989.x.

Schwartz, C. E., Keyl, P. M., Marcum, J. P., & Bode, R. (2009). Helping others shows differential benefits on health and well-being for male and female teens. *Journal of Happiness Studies*, 10(4), 431–448.

Schwartz, C. E., Quaranto, B. R., Bode, R., Finkelstein, J. A., Glazer, P. A., & Sprangers, M. A. G. (2012). Doing good, feeling good, and having more: Resources mediate the health benefits of altruism differently for males and females with lumbar spine disorders. *Applied Research in Quality of Life*, 7(3), 263–279. http://dx.doi.org/10.1007/s11482-012-9165-y.

Stull, D. E., Leidy, N. K., Parasuraman, B., & Chassany, O. (2009). Optimal recall periods for patient-reported outcomes: Challenges and potential solutions. *Current Medical Research and Opinion*, 25(4), 929–942. http://dx.doi.org/10.1185/03007990902774765.

Tscheulin, D. K., & Lindenmeier, J. (2005). The willingness to donate blood: An empirical analysis of socio-demographic and motivation-related determinants. *Health Services Management Research*, 18(3), 165–174.

Wallace, P. (2001). *The psychology of the internet.* Cambridge: Cambridge University Press.

Yu, C. -Y. (2002). *Evaluating cutoff criteria of model fit indices for latent variable models with binary and continuous outcomes.* University of California Los Angeles.