Article

Life-course social and economic circumstances, gender, and resilience in older adults: The longitudinal International Mobility in Aging Study (IMIAS)

Susan P. Phillips [a,*], Mohammad Auais [b], Emmanuelle Belanger [c], Beatriz Alvarado [d], Maria-Vitoria Zunzunegui [c]

[a] Queen's University, Department of Family Medicine, 220 Bagot St, Kingston, ON, Canada K7L 5E9
[b] Queen's University, School of Rehabilitation Therapy, 31 George St, Kingston, Canada K7L 3N6
[c] Public Health Research Institute (IRSPUM), Department of Social and Preventive Medicine, Université de Montréal, Montréal, Québec, Canada
[d] Queen's University, Public Health Sciences, 62 Fifth Field Company Lane, Kingston, Canada K7L 3N6

ARTICLE INFO

ABSTRACT

Although early socioeconomic adversity is associated with poorer function and health in adulthood, those who are able to adapt positively to such risks and threats develop a resilience that may ameliorate harm. Predictors of resilience have been examined in children, however exploring the relationship between life-course events, lived environments and current resilience among older adults across countries is novel. We specifically studied how childhood social and/or economic adversity and current socioeconomic resources were associated with resilience in 2000 community dwelling older men and women in Canada, Colombia, Brazil and Albania. The longitudinal International Mobility in Aging Study (IMIAS) collected information in 2012 and 2014 on childhood adversity, current income sufficiency social support and social engagement, and resilience (Wagnild Resilience Scale RS-14). Resilience levels were moderately high, and similar among women and men. Early social adversity predicted later resilience for some, with women but not men adapting positively. In contrast there was no bouncing back from early economic adversity. Current social engagement aligned with resilience (women only) as did social support from children (for women) and friends (for men). Partner support was of no advantage to either. Among men economic circumstances were stronger correlates of resilience while for women social circumstances were primary. The impact of site on resilience suggested that cultural norms and values have an independent effect on resilience of their populations, with strong and positive social ties more typical of Latin America than Canada appearing to offset lower absolute incomes. These findings are of importance because resilience is dynamic, can be fostered across the lifespan and is generally associated with greater health. Understanding which social assets and resources can be reinforced to build individual resilience offers a means for decreasing the harms of social and economic adversity.

Introduction

Although all illness ultimately arises from biochemical disruptions, it is often the interplay of socio-economic circumstances, social networks, and the lived environment with individual characteristics and genetics that precipitates those disruptions to homeostasis. In other words, bodies bear the impact of the world in which they live, of economic hardships and social opportunities that then alter individual biology (Felitti et al., 1998; Sousa et al., 2014). Complex interactions between socioeconomic realities, social connections, and psychological assets also shape resilience, an attribute that appears to offset adversity and augment physical as well as mental health throughout life (Mertens, Bosma, Groffen, & van Eijk, 2011). Understanding early predictors and more immediate correlates of resilience among older adults may reveal options for interventions to maintain health in later life.

What is resilience?

Although not a panacea for social and economic hardship, personal resilience may partially explain differences in how external events and exposures become embodied. In keeping with the definitions of others we view resilience as positive adaptation in the face of threats and challenges (Ahern, Kiehl, Sole, & Byers

2006; Masten, 2014). The common thread across definitions is that bouncing back or positive adaptation may follow or be triggered by adversity, whether from early childhood experiences such as trauma, or violence, current material deprivation or exposure to violence or, particularly among the elderly, loss (Ahern et al., 2006; Masten, 2014). While not dismissing the harms of deprivation or adversity, an ever expanding group of researchers is finding that, at times, resilience can be the silver lining to clouds of misfortune (Jain & Cohen, 2013). Resilience implies thriving, that is, not just an absence of pathology but also the development of strength in the face of exposure to risk (Rutter, 2006; Windle, Bennett, & Noyes, 2011). It arises from individual assets, environmental resources, and their interaction, and is dynamic, meaning it ebbs and flows throughout life. The folk wisdom of 'what doesn't kill you makes you stronger' is borne out in nascent research on the nature and experiences of those who demonstrate this strength.

The beginnings: evidence from developmental psychology

The study of resilience has its roots in developmental psychology (Garmezy, 1993). This is an area of research that identifies positive adaptation, sources of strength, assets, and well-being rather than deficits. Initial investigations looked at children whose development seemed normal despite exposure to significant trauma or adversity (Masten, 2001). A combination of individual assets such as intelligence, self-regulation, efficacy, optimism, motivation, attachment, and a sense of meaning, augmented by nurturing families and sociocultural resources appear to be protective (Sapienza & Masten, 2011). Among personal strengths, self control was seen to be of particular importance in the short and long-term (Mischel & Shoda, 1995; Casey et al., 2011). At the contextual level, resources that foster resilience include strong, supportive parents and connection/ engagement in one's community (Ungar, 2015). Across the many scales used to measure resilience, in diverse socioeconomic settings, and for boys and girls, greater early resilience is a consistent predictor of lower long-term inflammation and allostatic load, and greater mental and physical health (Chen & Miller, 2012).

Resilient older adults

Molecular biology and epigenetics provide evidence that in animals and humans behavioural experiences shape and alter brain development and function (Feder, Nestler, & Charney, 2009). Human neuroplasticity is not limited to early childhood as was initially thought. Understanding that this adaptability extends well into adulthood led researchers to expand their studies of resilience beyond the early years (Luthar, 1993). Among adults, characteristics such as mastery, internal locus of control, self-efficacy, determination, optimism, or a sense of meaning and purpose predict resilience (Kessel, 2013) which, in turn appears linked to better health (Windle, 2011), more successful aging despite illness (Mertens et al., 2011) and increased resistance to the harms of stress (Doorn & Hulsheger, 2013). Preliminary research suggests that the external resources of social connectedness and support are also closely aligned with adult resilience (Kessel, 2013; Stewart & Yuen, 2011) particularly for women (Stein & Smith, 2015). For example, among Americans, couple support augmented resilience to economic hardship (Conger, Rueter, & Elder, 1999). Whether resilience enables individuals to develop greater social capital, social networks and support or alternatively, whether having more social connections augments resilience has yet to be examined. Despite much remaining unexplained the evidence cited above suggests that external influences shape and modify innate psychological traits and together predict resilience. Recent findings also suggest that the cumulative effect of a lifetime of confronting

adversities can harm but may also foreshadow positive adaptation and strength in older adults (Wagnild & Collins, 2009) and could explain contentment with life despite declining physical health (Jeste et al., 2013).

The collective meaning of this research speaks to the concept that bodies do not exist isolated from lived environments nor do social circumstances affect all bodies in the same manner. Instead there is an interplay between the outside world and individual nature with each bending and shaping the other. Resilience may lie in or moderate the path between social circumstances and individual pathology. However, despite a significant volume of research on each domain alone, studies of resilience and those about the socioeconomic determinants of health rarely overlap, although emergent theories do. Those who hypothesize that the impact of socioeconomic deprivation is materialist tend to discount the explanatory value of individual psychological adaptation to deprivation (Oort, Lenthe, & Mackenbach, 2005; Marmot, Kogevinas, & Elston, 1987). Others postulate a psychosocial explanation suggesting that socioeconomic adversity produces inevitable psychological strain that diminishes individual well-being (Oort et al., 2005; Marmot et al., 1987).

Missing from both hypotheses is a deep examination of the interplay between external exposures and individual responses, that is, whether the context of people's lives alters their psychological being (or vice versa) in ways that augment or deplete the potentially intermediary trait of resilience. Unanswered questions about what constitutes adversity, the nature of resilience, and social circumstances that foster bouncing back and thriving remain. For example, parental loss in childhood, although rarely included in studies of adverse childhood experiences (ACE) is emerging as a potent and sustained source of adversity (Luecken & Roubinov, 2012; Li et al., 2014; Phillips & Carver, 2015). Because resilience is a dynamic attribute. It will vary across the life-course and be influenced by contextual socioeconomic realities and social relations (Klika & Herrenkohl, 2013; Masten, 2014)? The temporal relationship between early adversity and subsequent resilience implies a directionality much more difficult to establish when studying current circumstances and their effects. As a result, determining whether adversity in later life shapes resilience, whether the reverse is true (ie resilience alters any impact of adversity) or whether the relationship is circular is challenging.

A synopsis of existing evidence suggests that resilience is an asset, one that can be augmented in adults as well as earlier in life, and that is linked to many benefits including physical health, contentment, and stability regardless of illness (Jain & Cohen, 2013; Stewart & Yuen, 2011). However, research to identify individual characteristics and life-course or current social resources and economic opportunities or constraints associated with greater resilience among older adults is limited. Using data from an international prospective longitudinal study of adults, aged 65–74, our aim was to do just that, to identify precursors and correlates of resilience that might inform future policies and practices for building this individual asset as a means of improving health. Specifically, we set out to explore the following: 1) Do childhood social and/or economic adversities have any impact on resilience in later life and; 2) Are current economic and social resources associated with resilience among older adults, independent of any ongoing effects of childhood adversity?

Methods

Participants

This study is part of the longitudinal International Mobility in Aging Study (IMIAS) examining events across the life-course and

current health of community-dwelling older adults in the cities of Kingston (Canada), Saint-Hyacinthe (Canada), Tirana (Albania), Manizales (Colombia), and Natal (Brazil). Socioeconomic and cultural characteristics differ across, but are relatively homogeneous within each setting. As a result, within setting variability is unlikely to arise from religious, ethnic or cultural diversity which is, instead, captured by across site comparisons. Further information about the rationale for site selection and recruitment methods is detailed in a previous publication (Zunzunegui et al., 2015). A baseline sample of 1995 participants, ages 65–74 years, and with equal numbers of women and men, was recruited in 2012. Participants were contacted using patient lists from local medical centres. In Brazil, Colombia, and Albania researchers were able to invite perspective participants directly and participation rates were high (Latin America ~100%, Albania ~90%). Ethics guidelines in Canada necessitated indirect contact and therefore potential Canadian recruits received an invitation letter from their physicians, to which approximately 30% responded. Of these 95% entered the study. All participants were interviewed by a small group of local interviewers trained by one study coordinator. Interviews were conducted in participants' homes unless they requested an office location. Ethics approval was obtained at each site and all participants provided written, informed consent. The second assessment, done in 2014 included 1728 (~89% retain rate excluding 58 deaths). For the current analysis the 4 participants who did not complete the resilience questionnaire were excluded.

Variables and measurement tools

Resilience data were collected in 2014. To examine the temporal relationship between explanatory variables and this outcome all other variables are from 2012 data.

Outcome variable: Resilience

Wagnild's self-rated Resilience Scale (RS-14), validated among young and older adults and across settings/languages, measures individual resilience by considering equanimity, perseverance, self-reliance, meaningfulness and existential aloneness (Wagnild & Young, 1993; Damasio, Borsa, & da Silva, 2011; Alena, Baczwaski, Schulenberg, & Buchanan, 2015). Each of 14 statements is followed by a 7-point scale ranging from strongly disagree to strongly agree (see Appendix 1). Scores closer to the maximum of 98 imply greater resilience.

Explanatory variables
Childhood adversity. Using the dataset, exploratory factor analyses of several adverse events occurring prior to age 16 yielded two underlying factors we refer to as social and economic (Sousa et al., 2014).

Early childhood social adversity was measured with three questions (answers: yes, no) about parental drug use, and witnessing or experiencing physical violence in one's family.

"*Early childhood economic adversity* was measured with the three questions":

- During the majority of the first 15 years of your life,
  - what was the economic situation of your family? (good, average, poor)
  - would you say that there was a time in which you did not eat enough and that you were hungry? (yes, no).
- Did your father or mother not have a job for a long time when they wanted to be working? (yes, no).

Scores were calculated separately for early social and economic

adversity (Sousa et al., 2014) and each was categorized into 4 groups (no adversity, 1 adversity, 2, and 3 adversities) with 'no adversity' as the reference category. Because it is so frequently identified as a source of adversity in childhood, experiencing physical violence was also tested alone in a model that excluded the other early social adversity variables. Parental loss prior to age 15 was not part of the early social adversity measure. Its relationship with resilience was considered separately as well.

Current individual SES. Income sufficiency: To account for the range in absolute household income across sites we used income sufficiency as the measure of SES by asking "to what extent does your income allow you to meet your needs?" The responses were recorded using a 4 point Likert scale (1=very well to 4=not at all) and then dichotomized into two categories: income meets needs or not.

Current social engagement and support. Social support was assessed via the validated IMIAS-Social Networks and Social Support (SNSS) scale that had previously demonstrated links between this measure and health (Belanger et al., 2016). IMIAS-SNSS examines social ties with and emotional support from friends, family, partner, and children. Five point Likert-type responses to multiple questions about emotional support from and feelings of usefulness to children, partner, other family members and friends were collated for each of these four ties. Among others, questions included:

- Do you feel:

- that you are loved and appreciated by your (children, partner, friends)?
- that you play an important role in your (children, partner, friends) lives?
- useful to your (children, partner, friends)?

There were wide score variations by setting. We therefore developed 3 site-specific subgroups: no social support (partner, children, friends), low support (the lowest quartile), and high support (the highest 3 quartiles). Social support provided by family was not included as it was highly correlated (0.55) with support from children. In total, therefore, 9 variables were created for regression analyses (ie 3 sites × 3 subgroups per site). We considered carefully whether to measure social support within each site or across all settings and ultimately decided to use both. For consistency with previous IMIAS studies 'within setting' categories were initially utilized. However, to compare men and women we divided the overall cohort into tertiles of support regardless of setting.

To capture broader aspects of social integration described by Berkman, Glass, Brissette, & Seeman (2000) as relevant to well-being, a measure of *social engagement* was also included. This continuous variable was derived from answers to the following, scored as 0 (no engagement) or 1 (at least once a week) for each question:

- Attend a community center, a recreation center or a local, senior or golden age or professional association?
- Stroll about the stores, boutiques or mall?
- Participate in religious activities such as attending services, committees and/or choirs?

The overall social engagement score was the sum of scores for each question (range 0–3).

Statistical analyses

Distributions of baseline characteristics were compared between sexes using t-testing for continuous variables, median non-parametric testing for medians, and chi-square for categorical variables. Multiple linear regressions were performed to estimate mean change of the outcome (total resilience score) in relation to change in explanatory variables. All assumptions for linear regression models were tested (linearity, normality, independence, equal variance) and fulfilled. Correlations between variables were checked for possible multicollinearity.

To test the unique effect of each variable, they were first measured separately (Model 1 for childhood adversity and Model 2 for current socio-economic situation), then together (Model 3). These models were adjusted for age, sex, and sites as appropriate. The interaction terms site*social support and sex*social support were also tested in Model 3 and as some were significant we next stratified by site and sex. Since there were no major differences between Kingston and Saint-Hyacinthe and between Natal and Manizales, sites were classified into: Canadian, Latin American, and Albanian, which increased statistical power. Statistical analyses were performed using SAS Enterprise Guide version 6.1 (SAS Institute Inc., Cary, NC).

Results

The 1724 IMIAS participants (812 men and 913 women) were relatively equally distributed across all 5 survey sites. Their characteristics are described in Table 1.

Measuring resilience

Site mean scores on the resilience scale were moderately high and ranged from approximately 74–84 (out of 98) points. Differences in means for settings, although small, were statistically significant (multiple-comparison t-test of differences between all sites, $p < 0.05$) for all but the Canadian sites. Means for women and men, overall, were similar (see Fig. 1). The resilience scale showed excellent internal coherence with a Cronbach's alpha of 0.90 overall. Site-specific values ranged from 0.85 in Brazil, to 0.93 in Albania.

Adverse childhood experiences and adult resilience (see Table 2 Model 1)

Early economic deprivation foreshadowed lower current resilience, overall. Relative to those with none, reporting one such adversity decreased current mean resilience score by 1.2 points ($p=0.045$) while two lowered the mean score by 4.3 points ($p < 0.001$). The small group (6%) who had experienced all three early economic challenges also had lower current resilience however this association was not statistically significant (Table 2).

Few reported two (7%) or all three (2%) of the early social adversities included in the composite measure. In general, experiencing early social disadvantage had an opposite impact to that of early economic challenge. Those who reported one early social adversity had significantly greater adult resilience scores ($B=1.56$, $p=0.039$) than participants reporting none. Participants who had experienced two such adversities had similar resilience to those reporting none ($p=0.996$).

When separated out from the composite measure of early social adversity and examined alone (ie without controlling for the composite measure), those reporting childhood physical violence also had significantly higher resilience scores ($p=0.022$). A fourth indicator of early hardship, loss of one or both parents prior to age 16, was not related to resilience among participants (data not reported in tables).

Current social/economic characteristics and resilience (see Table 2 Model 2)

Self-reported income sufficiency varied among individuals and

Table 1
Characteristics of participants for the overall sample and stratified by sex/gender. Results reported in means (SD) unless otherwise specified.

Variable	Overall sample (n=1724)	Men (n=807)	Women (n=917)	P-value* (difference - women/men)
Age (years)	69.1 (2.9)	69.1 (2.9)	69.0 (2.8)	0.678
Resilience score	80.8 (11.4)	81.3 (11.0)	80.3 (11.7)	< 0.096
Income sufficiency n (%)	967 (56.5%)	472 (58.8%)	495 (54.5%)	0.070
Childhood economic adversities				0.226
0	917 (53.3%)	408 (50.6%)	509 (55.6%)	
1	479 (27.8%)	239 (29.6%)	240 (26.2%)	
2	225 (13.1%)	109 (13.5%)	116 (12.7%)	
3	101 (5.87%)	50 (6.3%)	51 (5.5%)	
Childhood social adversities				**0.009**
0	1323 (76.8%)	635 (78.8%)	688 (75.1%)	
1	246 (14.3%)	115 (14.3%)	131 (14.3%)	
2	113 (6.6%)	47 (5.8%)	66 (7.2%)	
3	40 (2.3%)	9 (1.1%)	31 (3.4%)	
Social support from friends n(%)				**< 0.001**
No friends	314 (18.4%)	160 (19.8%)	154 (17.1%)	
Low support	378 (22.0%)	213 (26.7%)	165 (18.0%)	
High support	1024 (59.6%)	430 (53.5%)	594 (64.9%)	
Social support from children n(%)				0.229
No children	154 (8.9%)	63 (9.0%)	91 (10.2%)	
Low support	429 (25.0%)	210 (25.8%)	219 (23.8%)	
High support	1136 (66.1%)	533 (66.2%)	603 (66.0%)	
Social support from partner n(%)				**< 0.001**
No partner	581 (34.2%)	134 (16.6%)	447 (49.0%)	
Low support	349 (19.7%)	178 (22.1%)	171 (18.5%)	
High support	793 (46.1%)	495 (62.3%)	298 (32.5%)	
Social engagement Median (quartile range)	1 (2)	1 (1)	1 (2)	**< 0.001**

Income sufficiency was dichotomized by whether income meets needs or not; social support from friends, children, and partner variables were measured using IMIAS-Social Networks and Social Support. Social engagement score ranges from 0 to 3. *Significance tested between women and men using t-test for continuous variables, median non-parametric test for medians, and chi-square for categorical variables.
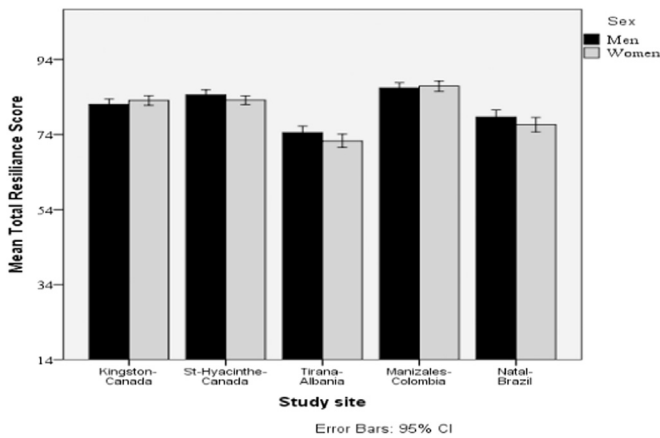
Fig. 1. Resilience by site and sex.

by site and sex. Having insufficient income aligned with lower resilience scores ($B = -4.19$, $p < 0.0001$) overall. Additionally,

among the tertile with the highest resilience scores, approximately 70% of those whose absolute incomes fell below the site-specific median never-the-less thought their incomes were sufficient. In contrast, among the one-third of participants with lowest resilience scores only 8% whose incomes were below the median considered this to be sufficient. Put another way, in addition to income sufficiency aligning with resilience, those with greater resilience found a lower absolute income to be sufficient.

Resilience was strongly linked with current social engagement. With increments in this measure came significant increases in resilience ($p < 0.0002$). The impact of support from partner, children and friends was more complex. Those with no friends were less resilient ($B = -1.52$, $p = 0.040$) relative to participants reporting highly supportive friendships. Having supportive children was linked to a 2 point higher resilience score compared with being childless ($B = -2.17$, $p = 0.020$) which, in turn was associated with greater resilience than was low support from one's children ($B = -2.05$, $p < 0.001$). However, having a partner, no matter how supportive, did not align with resilience in any manner.

Table 2
Multi-linear regression results of childhood adversities/socioeconomic variables that are associated with resilience (for overall cohort, n=1713).

Variable	Model 1 (R²=14%)			Model 2 (R²=17%)			Model 3 (R²=23%)		
	Estimate	SE	P-value	Estimate	SE	P-value	Estimate	SE	P-value
Intercept	88.31	6.22	< 0.0001	106.87	6.185	< 0.0001	106.50	6.163	< 0.0001
Childhood **economic** adversity									
0	Reference group			–			Reference group		
1	−1.22	0.606	**0.0452**				−0.76	0.594	0.2010
2	−4.34	0.823	**< 0.0001**				−3.35	0.809	**< 0.0001**
3	−1.58	1.170	0.1764				−0.20	1.152	0.8678
Childhood **social** adversity									
0	Reference group			–			Reference group		
1	1.56	0.752	**0.0390**				1.38	0.736	0.0612
2	0.01	1.061	0.9957				0.68	1.040	0.5133
3	−1.14	1.732	0.5098				−0.71	1.691	0.6782
Childhood physical abuse									
Yes	Reference group			–			–		
No	**−1.89**	**0.832**	**0.0229**	–					
Income sufficient									
Yes	–			Reference group			Reference group		
No	–			−4.19	0.657	**< 0.0001**	−4.04	0.660	**< 0.0001**
Social support provided by **friends**									
No friends				−1.52	0.741	**0.0401**	−1.34	0.745	0.0733
low support	–			−1.07	0.655	0.109	−0.95	0.654	0.1487
High support				Reference group			Reference group		
Social support provided by **children** (no children vs low support)									
No children	–			−2.17	0.918	**0.0182**	−2.16	0.914	**0.0185**
Low support	–			−2.05	0.619	**0.001**	−1.97	0.621	**0.0016**
High support	–			Reference group			Reference group		
Social support provided by **partner**									
No partner	–			0.38	0.630	0.5429	0.38	0.629	0.5414
low support	–			−0.52	0.695	0.4557	−0.49 −0.71	0.693	0.4764
High support	–			Reference group			Reference group		
Social Engagement	–			1.23	0.329	**0.0002**	1.16	0.329	**0.0004**

* Model 1: childhood economic and social adversities only; Model 2: current socioeconomic status only; model 3: both models 1 and 2 together. All three regression models accounted for the following confounders: age, sex, and sites. Scores: social and economic: 0(none); 1(one); 2(two); 3 (three adversities) for site-specific analyses. Friends, children and partner social support were categorized into 3 subgroups: no friend/partner/ children, low, and high support based on site=specific quartiles. Significant p-values are bolded. Regression procedure (proc reg) in SAS uses list-wise deletion and this explains the extra missing cases in the regression models.

Table 3
Multi-linear regression[*] results of childhood adversities/socioeconomic variables associated with resilience for Model 3, by site.

Variable	Canadian (n= 675) (R²=16%)			Latin (n= 676) (R²=12%)			Tirana (n=362) (R²=19%)		
	Estimate	SE	P-value	Estimate	SE	P-value	Estimate	SE	P-value
Intercept	92.46	8.286	< 0.0001	97.83	10.850	< 0.0001	136.99	14.100	< 0.0001
Childhood **economic** adversity									
0	Reference group			Reference group			Reference group		
1	− 0.39	0.739	0.6006	− 1.44	1.049	0.1685	1.31	1.503	0.3863
2	− 3.96	1.398	**0.0048**	− 3.17	1.340	**0.0184**	− 1.78	1.607	0.2680
3	− 4.85	4.209	0.2494	− 0.56	1.607	0.7271	1.57	2.455	0.5217
Childhood **social** adversity									
0	Reference group			Reference group			Reference group		
1	1.71	0.948	0.0718	1.24	1.173	0.2909	− 1.32	2.278	0.5619
2	0.70	1.335	0.5983	− 1.08	1.910	0.5725	2.15	2.355	0.3618
3	1.18	1.842	0.5208	− 4.45	3.496	0.2036	− 1.42	4.916	0.7722
Childhood physical abuse									
Yes	Reference group			Reference group			Reference group		
No	**− 3.69**	**1.04**	**0.0004**	− 1.99	1.50	0.183	− 0.402	2.14	0.852
Income sufficient									
Yes	Reference group			Reference group			Reference group		
No	− 6.59	1.366	**< 0.0001**	− 2.10	1.011	**0.0380**	− 4.717	1.309	**0.0004**
Social support provided by **friends**									
No friends	− 1.76	1.713	0.3051	− 2.24	1.047	**0.0328**	2.81	1.974	0.1538
low support	− 1.648	0.778	**0.0347**	− 0.99	1.251	0.4264	2.09	1.621	0.1990
High support	Reference group			Reference group			Reference group		
Social support provided by **children**									
No children	− 1.68	1.031	0.1033	− 3.57	1.731	**0.0395**	− 2.38	2.631	0.3645
Low support	− 1.53	0.789	0.0525	− 2.22	1.099	**0.0445**	− 2.77	1.505	0.0663
High support	Reference group			Reference group			Reference group		
Social support provided by **partner**									
No partner	0.01	0.777	0.9994	1.58	1.119	0.1562	− 0.05	1.632	0.9718
low support	− 0.51	0.913	0.5728	0.16	1.272	0.8976	− 0.35	1.527	0.8205
High support	Reference group			Reference group			Reference group		
Social Engagement	− 0.78	0.373	0.0530	2.52	0.564	**< .0001**	5.52	1.313	**< .0001**

[*] Using model 3 controlling for age and sex but disaggregating by site. Childhood physical abuse variable was tested without including childhood social adversity composite score.

Putting it all together (Table 2 Model 3)

Finally, we examined the relative contributions to resilience of early and current social and economic circumstances together. This diminished the negative impact of experiencing one childhood economic adversity ($B=-0.76$, p=0.201). When two such hardships were reported a greater than 3-point drop in resilience scores remained ($B=-3.35$, p < 0.001). After including current circumstances the impact of early social adversity slipped below significance ($B=1.38$, p=0.061). However, the significant positive effect of current social engagement ($B=1.16$, P=0.0004), support from children (no children $B=-2.16$, p=0.0185, and low supportive compared to high supportive children $B=-1.97$, p=0.0016) and current income sufficiency (insufficient compared to sufficient: $B=-4.04$, p= < 0.0001) on resilience persisted.

We observed that accounting for site increased the explanatory value of the full model (adjusted R^2) from 14% to 23%. Because of a significant interaction between social support and sites defined as Canada, Latin America and Albania, we separated setting results into these categories and repeated analyses (see Table 3). Of particular note was the difference in the association between current circumstances and resilience across the three groupings. Income sufficiency was most strongly aligned with resilience in Canada

followed by Albania, but was less meaningful (although still statistically significant) in Latin America. Social engagement while significant overall, was linked to greater resilience in Albanian and Latin American samples but inversely aligned in the Canadian group where the relationship was just below significance (p=0.053). Partner support remained insignificant for all. Among Latin American participants only, support from children was associated with greater resilience. The direction of the relationship was the same in Canada and Albania but lacked significance. On the other hand, lack of support from friends was associated with lower resilience in the Canadian cohort (B=− 1.648, p=0.0347) but not the Albanian, while among the Latin Americans only the absence of friends had any relationship with the outcome of lower resilience ($B=-2.24$, p=0.0328).

Again, evidence of interactions prompted us to disaggregate data by sex (see Table 4). Women, but not men, who had experienced one early social adversity had higher adult resilience scores ($B=2.15$, p=0.0393). In contrast early economic disadvantage was associated with lower adult resilience scores for all but more so for men than women. For example, among those with two childhood economic disadvantages the negative impact on men's resilience was almost twice that for women (B coefficient for men=− 4.15, p=0.0003, for women $B=-2.46$, p=0.0314). Current social

Table 4
Multi-linear regression[*] results of childhood adversities/socioeconomic variables that are associated with resilience (in Model 3), by sex.

Variable	Men (n=803) (R²=25%)			Women (n=910) (R²=32%)		
	Estimate	SE	P-value	Estimate	SE	P-value
Intercept	99.58	8.586	< 0.0001	109.45	8.739	< 0.0001
Childhood economic adversity						
0	Reference group			Reference group		
1	−1.04	0.838	0.2144	−0.41	0.850	0.6301
2	−4.15	1.149	**0.0003**	−2.46	1.144	**0.0314**
3	−1.09	1.607	0.4964	0.63	1.662	0.7016
Childhood Social adversity						
0	Reference group			Reference group		
1	0.40	1.045	0.6968	2.15	1.040	**0.0393**
2	0.37	1.571	0.8098	0.87	1.398	0.5305
3	−2.07	3.470	0.5495	−0.41	1.975	0.8320
Childhood physical abuse						
Yes	Reference group			Reference group		
No	−0.99	1.35	0.455	−3.02	1.12	**0.0071**
Income sufficient						
Yes		Reference group		Reference group		
No	−4.09	0.935	< **0.0001**	−3.86	0.940	< **0.0001**
Social support provided by **friends**						
No friends	−2.29	1.066	**0.0320**	−0.19	1.053	0.8510
low support	−1.06	0.906	0.2431	−0.80	0.958	0.4028
High support	Reference group			Reference group		
Social support provided by **children**						
No children	−2.62	1.438	0.0685	−1.90	1.206	0.1150
Low support	−1.30	0.896	0.1447	−2.68	0.873	**0.0022**
High support	Reference group			Reference group		
Social support provided by **partner**						
No partner	0.53	1.063	0.6163	0.11	0.817	0.8911
low support	0.36	0.934	0.6942	−1.48	1.042	0.1541
High support	Reference group			Reference group		
Social engagement	0.15	0.492	0.7548	1.95	0.447	< **0.0001**

[*] Using model 3 then disaggregating data by sex rather than controlling for sex. Childhood physical abuse variable was tested without including childhood social adversity composite score.

correlates of resilience among women were social engagement and support from children whereas for men only having friends was of significance. Income sufficiency maintained its strong relationship with resilience even when data were disaggregated by sex. Overall, social factors, whether remote or current, were more aligned with resilience in women whereas economic indicators were stronger correlates among men. Our full model, with more social than economic variables, explained more of the variability in resilience among women than men (adjusted R²: 32% versus 25%).

Discussion

Across four countries with different cultures and values, divergent individual and national levels of wealth, somewhat different life expectancies (life expectancy as of 2012: Albania 76.9, Brazil 74.5, Canada 81.6, Colombia 74.3) (WHO, 2016), and a wide span of past and current adversity, the men and women in this study showed moderately high mean levels of resilience. Means were comparable to or just less than those of a similar aged American sample measured using the same scale (mean 82.6) (Wells, Avers, & Brooks, 2012). Because we studied those who had lived beyond age 64 and independently, the healthiest and

perhaps the most resilient population from each setting would have been surveyed (WHO, 2016). All but the Canadian participants had exceeded the life expectancies of their birth cohort (United Nation, 2013). This selective survival could explain moderately high resilience scores overall.

Few have compared resilience of older men and women. In contrast to our findings and using a different measure of resilience among a British population women showed greater resilience than did men (Netuveli, Wiggins, Montgomery; Hildon, & Blane, 2008).

Early circumstances

Consistent with existing evidence, childhood economic disadvantage seemed to have an enduring impact, and foreshadowed lower resilience decades later (Miller et al., 2009; Morton, Schafer, & Ferraro, 2012; Shonkoff & Garner, 2012). However, controlling for current social and economic realities as well as age and sex attenuated that impact. Perhaps part of the apparent association between early economic circumstances and later resilience is ameliorated or at least explained by current characteristics.

While experiencing some early social adversity seemed to predict later resilience, particularly among women, this effect was not incremental. The small number of participants who had

experienced all three of the measured childhood social hardships may have meant that the study was underpowered to identify a reversal in their resilience as the burden of early social disadvantage increased. Alternatively, and as reported elsewhere (Bowes & Jaffee, 2013), at some point the harmful load of social disadvantages of childhood may reach a gender-specific tipping point and overwhelm any ability to positively adapt. Also in keeping with resilience literature but out of step with current ACE evidence is our finding that the specific early social adversity of physical violence is associated with greater resilience in later life (Felitti et al., 1998; Pitzer & Fingerman, 2010). Again, a key explanatory factor for this may be gender. To the best of our knowledge this is the first study to differentiate the subsequent impact of this early adversity on adult women and men, finding that it is really only women who seem to adapt positively. What combination of inherent assets and social resources or expectations act to protect and strengthen women and not men cannot be determined from this study, but would be valuable to identify in the future.

Prior IMIAS analyses showed early loss of a parent to be a predictor of poorer health for men but not women (Phillips & Carver, 2015). Current findings suggest that this female advantage did not arise from subsequent resilience as there was no association with, nor difference in adult resilience between men and women who experienced early parental loss. Once more, in keeping with the findings of others, our results imply that individuals may bounce back from some adversity but that adaptation after losing such a key source of support, nurturing and economic stability early in life is not the norm (Li et al., 2014; Luecken & Roubinov, 2012).

Current social and economic realities

Our examination of connections between resilience and current social support and engagement via family, friends or community activities is novel but does align with related research (Afifi & MacMillan, 2011; Cattell, 2001; Mertens et al., 2011). Neither women nor men were strengthened (ie had greater resilience) by having a partner or by the level of support offered by that partner. Our findings contrast with those of Conger et al. (1999) who identified couple support as a source of resilience (measured differently than in our study) to the specific harm of economic adversity. Support from children aligned with greater resilience for women but not men across all sites, and for Latin American participants. Perhaps the primacy for Latin Americans and women of children's support reflects traditional social and gender roles. Although we are cautious about over-interpreting findings, participants from Brazil and Colombia were most likely to live with extended family and were also the group for whom the external resource of support from children translated into greatest individual strength. A lack of friends had a negative impact on men but not women across the entire cohort. In considering settings, support from friends was a significant correlate of resilience solely in Canada. This, too, may speak to gender and cultural norms. Particularly in traditional settings women may focus inward on family while men tend to look outward to friends and work colleagues for their sense of community (Iyer, Sen, & Ostlin, 2008). Norms among Canadian participants were more distanced from the traditional. The Canadian sample had a higher rate of female employment than the rest, a lower birthrate, and were less likely to live in multigenerational households. All these factors may shift older Canadians' sense of sources of support away from children and toward friends. The most marked gender difference we uncovered was the very strong link between social engagement and resilience among women and the near total lack of such a link for men. Decades of research, particularly in developmental biology

and psychology, have shown this – that women, in particular, function 'in relation' and flourish when they maintain strong and supportive connections with those they encounter day to day (Wilson, 1992).

In contrast, although current income sufficiency aligned with resilience across gender and sites this was more pronounced in Canada, Albania, and among all men. The indicator, income sufficiency, offered the strength of cross-cultural meaning while allowing for individual and site specific definitions of poverty. It introduced an element of subjectivity leaving participants to self-define sufficiency. Quantifying income might seem like the better option however comparisons across countries with wide variations in wealth and cost of living would have limited meaning. Within some of the settings studied, minimal variability of income precluded using site specific economic gradients as indicators. Because income sufficiency has an embedded culture-specific component but does not eliminate individual assessment of deprivation or wealth it seemed the best single measure to choose.

Precipitants or outcomes?

Few observational studies are able to separate inputs from outcomes and identify directions of association or causality. With a span of 5–6 decades it seems safe to assume that childhood adversity led to rather than arose from associated adult characteristics. Untangling whether current social support predicts greater resilience, whether resilient adults are instead more likely to engage with their communities and be supported by others, or whether the relationship is bidirectional is more difficult. The two-year gap between when support (2012) and resilience (2014) were measured hints at directionality with resilience as the outcome. However, we cannot confidently establish causality or directionality of the relationship between current social circumstances and resilience.

The role of current economic status is even more complex. Income sufficiency was consistently linked with resilience. However, the relationship may be bidirectional or from resilience to income sufficiency. Those demonstrating greater resilience were more likely to consider their incomes to be sufficient at lower levels of absolute income suggesting that resilience may predict greater resourcefulness and/ or satisfaction despite limited material resources.

Social norms get under the skin

For the most part, the older adults surveyed live in cities of relative cultural homogeneity. However, across settings there is wide variation in values, norms, economic opportunity and achievement, and of social cohesion and connection. In the samples from Brazil, Colombia and Albania social engagement was more strongly linked to resilience whereas in Canada the relationship was reversed but marginally insignificant. While the majority of those in the Manizales (Colombia) and Natal (Brazil) groups have limited financial resources their culture is one of high social connection and cohesion (Stemplowski, 2009). In contrast, the Canadian cohorts have more education and greater affluence but live in settings where social cohesion has likely diminished, replaced by an ever increasing regard for accomplishment, whether measured by income or career.

Because of the large study sample size small variations in resilience scores across sites appeared to be statistically significant. Means for each setting were all moderately high. Similar resilience across groups with markedly different socioeconomic realities suggests that contextual characteristics captured by the indicator of 'site' may act along with, or shape individual social and economic realities to alter resilience. Greater current social support

and engagement lessened the observed impact of early material and social deprivation. Perhaps other unmeasured site-specific factors also offset the harms of economic deprivation. Although resilience ultimately arises from psychological assets, it is molded by these sorts of external circumstances arising from the lived environment, that then 'get under the skin' to augment inherent capacity (Ungar, 2015).

What we are observing may be an important 'place effect' that acts on all who live within a setting. Including the variable of 'setting' in our analyses increased the explanatory value, that is, the amount of variability in resilience explained by the study, by more than 50%. This is in keeping with findings of a review of well-being among children and youth where area social capital offset economic deprivation (Vyncke et al., 2013). In general, older populations of the five IMIAS study communities have lived their entire lives in one city or even the same neighbourhood. Although there is more poverty and violence in Colombia and Brazil than in Canada, there may also be cultural strengths inherent in these settings that foster individual resilience. Our findings duplicate what others described as the Hispanic paradox in studies of younger populations. Those with strong attachments to family and community, a fundamental component of Hispanic heritage and culture, had greater well-being than would be expected based on their SES, alone (Gould, Madan, Qin, & Chavez, 2003). We may be demonstrating the potential individual resilience benefit of an environment of social cohesion, and suspect that entwined in this strength are other unmeasured aspects of social life that are fostered by shared values, traditions, or close family ties (Berkman et al., 2000).

Limitations

Although new and validated resilience scales appear with some frequency the meaning of such measures is still being debated and is evolving (Ahern et al., 2006). Regardless, the link between resilience, across measures, and well-being is consistent and clear making this construct one that merits consideration in life-course and social determinants research. We chose the frequently used Wagnild RS-14 Resilience Scale knowing that, along with other scales, much of its validation has been in higher income, English language settings. We were careful with scale translation and back translation, and there is no reason to doubt the measure. Never the less results from its use in middle income countries should be interpreted cautiously.

Participants seem representative of the cultural norms of each setting but this is difficult to establish with any certainty. They match their age group with respect to education and income in all but Kingston, Canada (where they are, on average, better educated). All live in cities with limited ethnic and cultural diversity among their age group. However, in all but the Canadian sites those alive and able to participate, although representative of their age group, have outlived much of their birth cohort. We are therefore, hesitant to generalize findings.

Recall of childhood circumstances is not without bias, some of which may be entwined with resilience, itself. Although loss of a parent is likely remembered accurately, early economic deprivation, hunger, or violence are more subjective and responses may represent differences in recall or interpretation rather than actual experience. Only a longitudinal dataset extending across participants' lives could eradicate this potential bias.

The complexity of the lived environment makes drawing causal inferences near to impossible. We, therefore, avoid assigning such meaning to the association between setting, as a proxy for social environment, and resilience. Instead our findings should be considered preliminary and in need of replication.

Conclusion

Evidence from others hints that individual resilience is central to why early or current adverse socioeconomic circumstances seem to harm some while strengthening others. Our aim was to identify some of these social and economic circumstances and their differential impact on older women and men and across countries with a range of cultural norms and resources. We found moderately high levels of resilience among participants, similar for women and men but with statistical variation across settings. Never the less, cultural cohesion in Latin American participants and social connection for the women studied may have moderated the expected harms of greater economic deprivation to minimize differences in resilience scores across site and gender.

Women experiencing early social adversity seemed able to adapt positively, developing resilience in later life. Current social engagement and some support from children also aligned with greater resilience in the women studied. Among men the strongest correlates of positive adaptation were early and current economic advantage and having friends. Having a partner, whether supportive or not was of no consequence for women or men in this analysis.

We have added to knowledge about how the outside world gets under the skin, demonstrating that the context of people's lives appears to alter psychological attributes that collectively shape resilience. This is information that may, in future, deepen both materialist and psychosocial explanations of the connections between wealth and health.

Acknowledgements

Appendix 1

Wagnild Resilience Scale (RS 14)

All scored as follows:

1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
Strongly disagree			Neutral			Strongly agree

1. I usually manage one way or another.
2. I feel proud that I have accomplished things in life.
3. I usually take things in stride.
4. I am friends with myself.
5. I feel that I can handle many things at a time.
6. I am determined.
7. I can get through difficult times because I've experienced difficulty before.
8. I have self-discipline.
9. I keep interested in things.
10. I can usually find something to laugh about.
11. My belief in myself gets me through hard times.
12. In an emergency, I'm someone people can generally rely on.
13. My life has meaning.
14. When I'm in a difficult situation, I can usually find my way out of it.

References

Afifi, T. O., & MacMillan, H. L. (2011). Resilience following child maltreatment: a review of protective factors. *Canadian Journal of Psychiatry*, 56, 266–272.

Ahern, N. R., Kiehl, E. M., Sole, M. L., & Byers, J. (2006). A review of instruments measuring resilience. *Issues in Comprehensive Pediatric Nursing*, 29, 103–125.

Alena, B. J., Baczwaski, B. J., Schulenberg, S. E., & Buchanan, E. M. (2015). Measuring resilience with the RS-14: a tale of two samples. *Journal of Peer Assessment*, 97, 291–300.

Belanger, E., Ahmed, T., Vafaei, A., Curcio, C. L., Phillips, S. P., & Zunzunegui, M. V. (2016). Sources of social support associated with health and quality of life: a cross-sectional study among Canadian and Latin American older adults. *BMJ Open*, 6, e011503. http://dx.doi.org/10.1136/bmjopen-2016-011503.

Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social Science and Medicine*, 51, 843–857.

Bowes, L., & Jaffee, S. R. (2013). Biology, genes, and resilience: toward a multi-disciplinary approach. *Trauma Violence Abuse*, 14, 195–208.

Casey, B. J., Somerville, L. H., Gotlib, I. H., Ayduk, O., Franklin, N. T., Askren, M.K., & Shoda, Y. (2011). Behavioral and neural correlates of delay of gratification 40 years later. *PNAS*, 108, 14998–15003.

Cattell, V. (2001). Poor people, poor places, and poor health: the mediating role of social networks and social capital. *Social Science and Medicine*, 52, 1501–1516.

Chen, E., & Miller, G. E. (2012). "Shift-and-persist" strategies: why low socio-economic status isn't always bad for health. *Perspectives on Psychologicl Science*, 7, 135–158.

Conger, R. D., Rueter, M. A., & Elder, G. H. (1999). Couple resilience to economic pressure. *Journal of Personality and Social Psychology*, 76, 54–71.

Damasio, B. F., Borsa, J. C., & da Silva, J. P. (2011). 14-item resilience scale (RS-14): psychometric properties of the Brazilian version. *Journal of Nursing Measurement*, 19, 131–145.

Doorn, R. R. A., & Hulsheger, U. R. (2013). What makes employees resilient to job demands? The role of core self-evaluations in the relationship between job demands and strain reactions. *European Journal of Work and Organizational Psychology*, 24, 76–87.

Feder, A., Nestler, E. J., & Charney, D. S. (2009). Psychobiology and molecular genetics of resilience. *Nature Reviews Neuroscience*, 10, 446–457.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Dube, S. R. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. *American Journal of Preventive Medicine*, 14, 245–258.

Garmezy, N. (1993). Children in poverty: resilience despite risk. *Psychiatry*, 56, 127–136.

Gould, J. B., Madan, A., Qin, C., & Chavez, G. (2003). Perinatal outcomes in two dissimilar immigrant populations in the United States: a dual epidemiologic paradox. *Pediatrics*, 111(6 Pt 1).

Iyer, A., Sen, G., & Ostlin, P. (2008). The intersections of gender and class in health status and health care. *Global Public Health*, 3(S1), 13–24.

Jain, S., & Cohen, A. K. (2013). Fostering resilience among urban youth exposed to violence: a promising area for interdisciplinary research and practice. *Health Education and Behavior*, 40, 651–662.

Jeste, D. V., Savla, G. N., Thompson, W. K., et al. (2013). Association between older age and more successful aging: critical role of resilience and depression. *American Journal of Psychiatry*, 170, 188–196.

Kessel, G. (2013). The ability of older people to overcome adversity: a review of the resilience concept. *Geriatric Nursing*, 34, 122–127.

Klika, J. B., & Herrenkohl, T. I. (2013). A review of developmental research on resilience in maltreated children. *Trauma Violence Abuse*, 14, 222–234.

Li, J., Vestergaard, M., Cnattinghuis, S., Gissler, M., Bech, B. H., & Olsen, J. (2014). Mortality after parental death in childhood: a nationwide cohort study from three Nordic countries. *PLoS Medicine*, 11, e1001679.

Luecken, L. J., & Roubinov, D. S. (2012). Pathways to lifespan health following childhood parental death. *Soc Personal Psychol Compass*, 6, 243–257.

Luthar, S. S. (1993). Annotation: methodological and conceptual issues in the study of resilience. *Journal of Child Psychology and Psychiatry*, 34, 441–453.

Marmot, M. G., Kogevinas, M., & Elston, M. A. (1987). Social/economic status and disease. *Annual Review of Public Health*, 8, 111–135.

Masten, A. S. (2001). Ordinary magic. Resilience processes in development. *American Psychologist*, 56, 227–238.

Masten, A. S. (2014). Global perspectives on resilience in children and youth. *Child Development*, 85, 6–20.

Mertens, V.-C., Bosma, H., Groffen, A. I., & van Eijk, T. M. (2011). Good friends, high income or resilience? What matters most for elderly patients? *European Journal of Public Health*, 22, 666–671.

Miller, G. E., Chen, E., Fok, A. K., Walker, H., Lim, A., Nicholls, E. F., & Kobor, M. S. (2009). Low early-life social class leaves a biological residue manifested by decreased glucocorticoid and increased proinflammatory signaling. *PNAS*, 106, 14716–14721.

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Reviews*, 102, 246–268.

Morton, P. M., Schafer, M. H., & Ferraro, K. F. (2012). Does childhood misfortune increase cancer risk in adulthood? *Journal of Aging and Health*, 24, 948–984.

Netuveli, G., Wiggins, R. D., Montgomery, S. M., Hildon, Z., & Blane, D. (2008). Mental health and resilience at older ages: bouncing back after adversity in the British Household Panel Survey. *Journal of Epidemiology and Community Health*, 62, 987–991.

Oort, F. V. A., Lenthe, F. J., & Mackenbach, J. P. (2005). Material, psychosocial, and behavioural factors in the explanation of educational inequalities in mortality in the Netherlands. *Journal of Epidemiology and Community Health*, 59, 214–220.

Phillips, S. P., & Carver, L. (2015). Early parental loss and self-rated health of older women and men: a population-based, multi-country study. *PLoS ONE*, 10(4), e0120762. http://dx.doi.org/10.1371/journal.pone.0120762.

Pitzer, L. M., & Fingerman, K. L. (2010). Psychosocial resources and associations between childhood physical abuse and adult well-being. *Journal of Gerontology: Psychological Sciences*, 64B, 425–433.

Rutter, M. (2006). Implications of resilience concepts for scientific understanding. *Annals of the New York Academy of Sciences*, 1094, 1–12.

Sapienza, J. K., & Masten, A. S. (2011). Understanding and promoting resilience in children and youth. *Current Opinion in Psychiatry*, 24, 267–273.

Shonkoff, J. P., & Garner, A. S. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129, e232–e246.

Sousa, A. C. P. A., Guerra, R. O., Tu, M. T., Phillips, S. P., Guralnik, J., & Zunzunegui, M. V. (2014). Lifecourse adversity and physical performance across countries among men and women aged 65-74. *PLoS ONE*, 9(8), e102299. http://dx.doi.org/10.1371/journal.pone.0102299.

Stein, E. R., & Smith, B. W. (2015). Social support attenuates the harmful effects of stress in healthy adult women. *Social Science and Medicine*, 146, 129–136.

Stemplowski, R. (2009). *On the state of Latin American states: approaching the bicentenary* (p. p291) Kracov, Poland: Andrzeja Frycza Modrzewski Kraków University.

Stewart, D. E., & Yuen, T. (2011). A systematic review of resilience in the physically ill. *Psychosomatics*, 52, 199–209.

Ungar, M. (2015). Practitioner review: diagnosing childhood resilience – a systemic approach to the diagnosis of adaptation in adverse social and physical ecologies. *Journal of Child Psychology and Psychiatry*, 56, 4–17.

United Nations Department of Economic and Social Affairs. (2013). *World Population Prospects, the 2010 revision.* ⟨https://esa.un.org/unpd/wpp/⟩ Accessed 04.06.13.

Vyncke, V., Clercq, B., Stevens, V., Costongs, C., Barbareschi, G., Johnsson, S.H., & Maes, L. (2013). Does neighbourhood social capital aid in levelling the social gradient in the health and well-being of children and adolescents? A literature review. *BMC Public Health*, 13, 65. ⟨http://www.biomedcentral.com/1471-2458/13/65⟩.

Wagnild, G. M., & Collins, J. A. (2009). Assessing resilience. *Journal of Psychosocial Nursing and Mental Health Services*, 47, 28–33.

Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the resilience scale. *Journal of Nursing Measurement*, 1, 165–178.

Wells, M., Avers, D., & Brooks, G. (2012). Resilience, physical performance measures and self-perceived physical and mental health in older Catholic nuns. *Journal of Geriatric Physical Therapy*, 35, 126–131.

Wilson, E. O. (1992). *Sociobiology*. Boston: Harvard University Press.

Windle, G. (2011a). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*, 21, 152–169.

Windle, G., Bennett, K. M., & Noyes, J. (2011b). A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes*, 9, 8. ⟨http://www.hqlo.com/content/9/1/8⟩.

World Health Organization (2016). *Global Health Observatory Data Repository*. ⟨http://apps.who.int/gho/data/node.main.688⟩ Accessed 06.08.16.

Zunzunegui, M. V., Alvarado, B. E., Guerra, R., Gomez, J. F., Ylli, A., & Guralnik, J. M. (2015). The mobility gap between older men and women: the embodiment of gender. *Archives of Gerontology and Geriatrics*, 61, 140–148.