



## ORIGINAL ARTICLE

## Friendship trust and psychological well-being from late adolescence to early adulthood: A structural equation modelling approach

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### Abstract

**Aims:** This study explored the sex-specific associations between friendship trust and the psychological well-being of young Swedes from late adolescence to early adulthood. **Methods:** A random sample of native Swedes born in 1990 was surveyed at age 19 years and again at age 23 years regarding their own well-being and their relationships with a maximum of five self-named peers. The response rate was 31.3%, resulting in 782 cases to be analysed. We used sex-stratified structural equation models to explore the associations between trust and well-being. Psychological well-being was constructed as the latent variable in the measurement part. The structural part accounted for the autocorrelation of trust with respect to well-being over time and incorporated the cross-lagged effects between late adolescence and early adulthood. **Results:** It was found that trust increased while well-being decreased for young men and remained stable for young women from 19 to 23 years of age. The young women reported lower well-being at both time points, whereas no sex difference was found for trust. Based on model fit comparisons, a simple model without forward or reward causation was accepted for young men, whereas reversed causation from well-being to trust was suggested for young women. Subsequent analysis based on these assumptions confirmed the reversed effect for young women. **Conclusions:** The findings suggest that young people do not benefit from trustful social relations to the same extent as adult populations. Young women who express impaired well-being run a greater risk of being members of networks characterized by low friendship trust over time.

**Key Words:** Friendship trust, well-being, late adolescence, early adulthood, social networks, structural equation modelling

### Introduction

Previous research has often addressed the positive health implications of supportive social ties. As an essential ingredient of social capital, interpersonal trust has been shown to relate to the mental health [1] and well-being [2] of an individual, which consist of pleasant affects, the lack of unpleasant affects, and life satisfaction [3]. However, recent approaches have elaborated on the causal direction of these associations and have cast doubt on the prevailing notion that causality proceeds from trust to health [4,5]. Associations between trust and

well-being may derive from (a) forward causation from trust to well-being, (b) reversed causality, (c) bidirectional associations or (d) confounding from joint exposures. Although previous studies have largely relied on cross-sectional research [6], there is prevailing consent that trust determines well-being and health. The contrary view that associations may stem from health selection or reversed causality – that is, health conditions inhibiting trustful relations – has rarely been addressed. A few studies have contested the conventional notion

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(Accepted 21 October 2016)

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DOI: 10.1177/1403494816680784  
[journals.sagepub.com/home/sjp](http://journals.sagepub.com/home/sjp)



and found that trust and well-being and health outcomes have a circular association [4,5].

To elicit the directionality of association, a potentially compelling point of departure is to examine the younger segments of the adult population. The appeal lies in the relatively high prevalence of psychological disorders in this specific group, parallel to the fact that increasingly frequent and intense peer interactions at this age coincide with growing independence from the parental influences and school environments that configure and structure the social interactions of adolescents [7]. Psychological well-being can be regarded as a construct of peoples' feelings and describes how they experience affects such as moods, values, and attitudes [8]. In addition to affective reactions, well-being embodies more temporally stable cognitive evaluations, including perceptions, recollections, and comparisons, which are essential in assessments of an individual's happiness and life satisfaction [8,9]. Well-being is usually highly correlated with mental health. The criteria of mental health include an individual's positive conceptions of themselves, the capacity to control important life events, and the ability to care about the self and others [10]. Mental health can be regarded as a sub-domain of the conceptually broader construct of well-being, which covers a larger spectrum of psychological states and is not only restricted to the mental plane. In contrast to mental health, well-being may be context-specific and directed to distinct domains such as family, school, job, leisure or to oneself [8]. In Sweden and other Western societies, psychological disorders and reduced well-being are widespread, especially among female adolescents and young adults [11]. Reduced well-being in adolescence has been shown to precede more manifest mental health problems such as depression, but has also been recognized to indicate maladaptive social relationships with others and an increased risk of suicide [12,13].

Interpersonal trust is an important aspect of social capital [14,15]. In general, sociological conceptions understand trust not only as a cognitive dimension, but also emphasize its social function and close relation to resource mobilization [16]. Evolving from social relations, trust reduces the uncertainty in interpersonal interactions [17]. Individuals in trustful relations benefit from access to other forms of human capital [14] and may rely on the perpetual confidence that their peers will provide support on demand. Stronger and weaker forms of trust, depending on its appearance on either the individual or ecological level, have been identified [18,19]. Several mechanisms have been proposed to constitute the causal links between these aspects and health and well-being – for instance, trustful social relations may enhance psychological capabilities (e.g. self-efficacy,

self-esteem and the buffering of stress) and further prompt biological processes by suppressing neuroendocrine responses and increasing immune responses [14]. The influence on health behaviours is ambivalent, as trustful social relations facilitate the spread of health-enhancing practices in a similar manner to behaviours hazardous to health [20].

The higher prevalence of reduced well-being and psychological difficulties among women and their greater ability to develop more intense social relations [21,22] may expose them to the adverse consequences of deficient social relationships with a lack of trust to a greater extent than men. To account for these differences, sex-specific analyses were conducted.

#### *Aim and research questions*

The aim of the current study was to examine changes in friendship trust and psychological well-being from late adolescence to early adulthood as well as the directions of these associations. Special attention was paid to sex differences. From these objectives, the following research questions were synthesized:

1. Does friendship trust change from late adolescence to early adulthood?
2. Does psychological well-being change from late adolescence to early adulthood?
3. Is there an association between friendship trust and psychological well-being in late adolescence and/or early adulthood?
4. Does friendship trust in late adolescence predict psychological well-being in early adulthood and/or does psychological well-being in late adolescence predict friendship trust in early adulthood?

#### **Methods**

The study was based on a two-wave panel on social capital and ego-centric social networks that forms part of the larger study Individual Life Chances in Social Context (LIFEINCON). Ethical permission to conduct the study was received from the Ethical Review Board of Stockholm (2008/580-31). The strategic sample consisted of 2500 Swedes born to native parents in 1990, of whom 1382 (55.3%) could be reached for an interview in the first wave (T1). At the time of the interview most respondents had turned 19 years of age. In the second wave (T2), 805 participants aged 23 years responded to the interview. The current study was based on 782 participants who had full information on all study variables in both waves, corresponding to 31.3% of the respondents in the overall sample. The study was conducted as a telephone survey by Statistics Sweden. The primary reason for non-response was

the widespread use of unregistered prepaid phones in this particular age group, which impeded the linkage of selected respondents to telephone numbers.

#### *Friendship trust*

The survey included a set of questions about the respondents' social networks. The respondents were requested to name up to five persons (i.e. alters) with whom they maintained close relationships and spent most of their spare time. These alters were supposed to refer to friends, but could also be family members or romantic partners. All named alters were retained for the analysis, acknowledging that relatives and romantic partners may play multiple parts and also act as friends. At T1, the share of named relatives and romantic partners was 8.4%, increasing to 16.5% at T2. The share of named peers in waves T1/T2 was distributed as follows: 58/56% with five alters, 15/14% with four alters, 18/19% with three alters, 6/9% with two alters and 3/3% with one alter. Respondents were asked to rate their relationship trust for each of their mentioned alters. The corresponding question was phrased as 'How much do you trust alter #?' and included five response alternatives ranging from 'not at all' (1) to 'very much' (5). The derived sum score was then divided by the number of named alters to yield an average score for relationship trust.

#### *Psychological well-being*

Psychological well-being was constructed on the basis of six single indicators: 'I'm often tense and nervous' (tense); 'I often feel sad and down' (sad); 'I manage to do a lot' (energy); 'Overall, I'm happy' (happy); 'I'm mostly satisfied with myself' (pleased); and 'I'm often grouchy or irritated' (grouchy). The response options of all items referred to: matches exactly; matches roughly; neither matches nor does not match; matches poorly; and does not match at all. As two of the positive items were diametrically opposed to the negative items, the response options of happy and pleased were reversed. The instrument has been evaluated and used previously [23]. In this study, the consistency of the constructed variable was tested with exploratory factor analysis using varimax orthogonal rotation. Cronbach's  $\alpha$  was 0.73 at T1 and 0.77 at T2 for men and 0.77 at T1 and 0.72 at T2 for women.

## **Results**

The distribution of sex-specific ratings of friendship trust and psychological well-being and their changes from age 19 to age 23 years are given in Table I. Because two of the items were recoded, higher values consistently denote better well-being. Based on

independent sample *t*-tests, the results showed that women reported higher levels of trust than men at both time points. However, the women reported lower well-being, particularly in terms of being more tense and sad as well as being less pleased. When examining changes over time, the results suggest that friendship trust increases from age 19 to age 23 years, whereas well-being remains largely stable (with the exception of a slight improvement in feeling tense and sad among men and an increase of feeling grouchy among women).

The sex-specific associations between trust and well-being were explored on the basis of a series of structural equation models using maximum likelihood estimation. The initial baseline model was set up with the respective associations between trust and well-being at T1 and T2 and including the autoregressive paths for friendship trust at T1 to T2 and for the latent factors of well-being from T1 to T2. The included autoregressive pathways indicate the degree of stability of the measures from T1 to T2. The error terms for the well-being items were allowed to be correlated (results not shown).

To identify the most appropriate model, four competing models (Figures 1 (a)–1 (d)) were tested against each other: the baseline model (model 1), a forward causation model with a cross-lagged pathway from trust at T1 to well-being at T2 (model 2), a reversed causation model with a cross-lagged pathway from well-being at T1 to trust at T2 (model 3) and a bidirectional model with both cross-lagged pathways (model 4).

According to recommendations, the choice of model was guided by a combined use of multiple model fit statistics and information criteria [24]. In acceptable models, the standardized root mean square residual (RMSEA) should be less than or close to 0.06, whereas both the comparative fit index (CFI) and the Tucker–Lewis index (TLI) should be close to or  $>0.95$ . The relative goodness of model fit was assessed with the Akaike information criterion (AIC) and the Bayesian information criterion (BIC). Lower values on both indicators relative to the other models indicate a better fit.  $\chi^2$  difference tests for the comparison of hierarchically nested models were carried out. The sex-specific fit indices are shown in Table II.

For the sample of men, all four models disclosed an acceptable model fit with nearly equal values for RMSEA (0.035), CFI (0.974) and TLI (0.965–0.966) across all models. Model 1 had a lower AIC and BIC than models 2–4 and the  $\chi^2$  difference test indicated that none of models 2–4 performed better than model 1. In the sample of women, the values for RMSEA (0.046–0.048), CFI (0.953–0.957) and TLI (0.937–0.957) implied an acceptable fit across all

Table I. Distribution of the study variables (n=782).

	Men (n=399)				Women (n=383)				Comparison men/women <sup>a</sup>	
	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Mean	Standard deviation	Mean difference	t-test
<b>Time 1</b>										
Friendship trust	0	5	4.33	0.70	0	5	4.45	0.53	-0.12	**
Tense	1	5	4.07	0.97	1	5	3.64	1.10	0.42	***
Sad	1	5	4.40	0.87	1	5	3.91	1.08	0.49	***
Energy	1	5	3.99	0.89	1	5	3.90	0.83	0.09	n.s.
Happy	1	5	4.41	0.73	1	5	4.36	0.79	0.05	n.s.
Pleased	1	5	4.17	0.83	1	5	3.85	0.91	0.32	***
Grouchy	1	5	4.12	0.82	1	5	3.97	0.87	0.15	*
<b>Time 2</b>										
Friendship trust	0	5	4.43	0.60	0	5	4.53	0.57	-0.10	*
Tense	1	5	3.92	1.08	1	5	3.66	1.15	0.26	**
Sad	1	5	4.25	0.98	1	5	3.87	1.07	0.38	***
Energy	1	5	3.92	0.98	1	5	3.92	0.92	-0.00	n.s.
Happy	1	5	4.38	0.76	1	5	4.42	0.78	-0.03	n.s.
Pleased	1	5	4.09	0.83	1	5	3.89	0.99	0.19	**
Grouchy	1	5	4.11	0.92	1	5	4.16	0.87	-0.05	n.s.
Comparison T2-T1 <sup>b</sup>										
	Mean difference			t-test	Mean difference			t-test		
Friendship trust	0.10			*	0.08			*		
Tense	-0.15			*	0.01			n.s.		
Sad	-0.15			**	-0.04			n.s.		
Energy	-0.07			n.s.	0.02			n.s.		
Happy	-0.03			n.s.	0.05			n.s.		
Pleased	-0.08			n.s.	0.04			n.s.		
Grouchy	-0.00			n.s.	0.19			***		

\*\*\*p<0.001, \*\*p<0.01, \*p<0.05.

Note: higher values indicate higher levels of friendship trust and psychological well-being (items tense, sad and grouchy are reversed).

<sup>a</sup>A positive difference value reflects that men are better than women, whereas a negative difference value suggests the opposite.

<sup>b</sup>A positive difference value indicates an improvement over time, whereas a negative difference value reflects the opposite.

four models. Model 2 had the lowest TFI (0.937) and model 3 had the lowest AIC and BIC. Taking into account the  $\chi^2$  difference test, model 4 was preferred over models 1 and 2, but did not perform better than model 3.

As proposed by the model fit statistics, model 1 was selected for men and model 3 for women. The correlations of relevant associations and the factor composition derived from the structural equation modelling are shown in Figure 2 (error terms have been omitted). With the exception of the item tense, the factor loadings of well-being for men were higher at T2 than at T1. In the sample of women, the factor loadings decreased for nearly all items. The stepwise removal of items with low loadings was tested, but did not significantly improve the model fit. The internal consistency of well-being as indicated by Cronbach's  $\alpha$  improved for men from T1 to T2 (0.72/0.77) and decreased for women (0.77/0.72).

The autocorrelation coefficient for friendship trust was 0.32 (p<0.001) for men and 0.23 (p<0.001) for

women. For well-being, the auto-regressive pathway had a coefficient of 0.56 (p<0.001) for men and 0.64 (p<0.001) for women, indicating that well-being is more stable than friendship trust over time. A performed significance test confirmed the higher stability of well-being over time compared with trust. Regarding the associations between trust and well-being at T1, moderate correlations with an identical coefficient of 0.20 (p<0.001) were found for men and women. The respective associations at T2 were 0.12 (p<0.05) for men and 0.05 (n.s.) for women. Post-estimations confirmed that the associations between trust and well-being were significantly lower at T2 than at T1. The coefficient of the cross-lagged pathway in the sample of women was 0.14 (p<0.05), suggesting that well-being at T1 predicts friendship trust at T2.

**Discussion**

This study explored the changes in friendship trust and psychological well-being during the transition

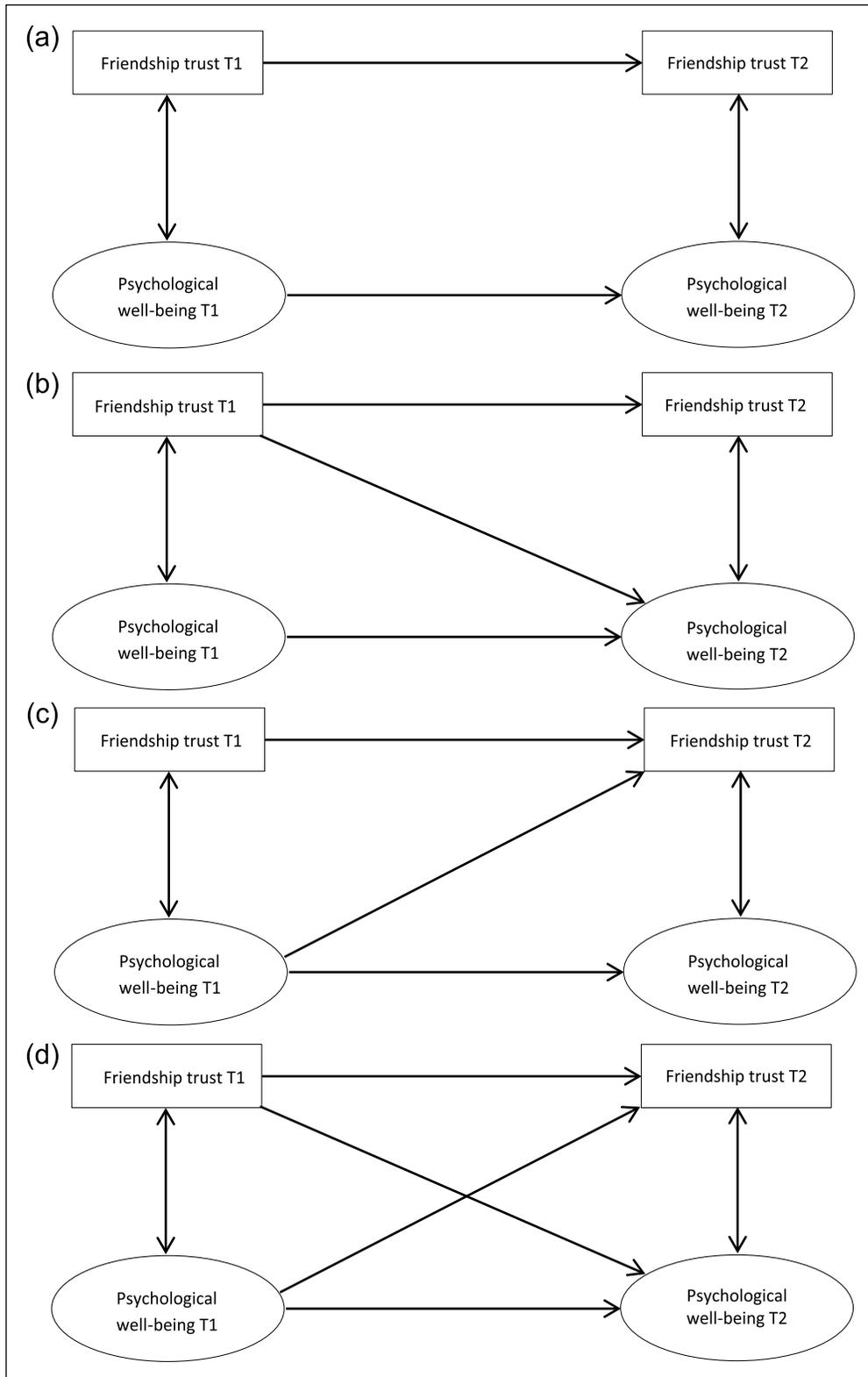


Figure 1. (a) Baseline (model 1); (b) forward causation (model 2); (c) reversed causation (model 3); and (d) bidirectional causation (model 4).

from late adolescence to early adulthood. Based on structural equation modelling encompassing cross-sectional correlations and cross-lagged effects, the

study investigated whether forward or reversed causation contributed to the overall association between trust and well-being.

Table II. Goodness of fit statistics for the tested models ( $n=782$ ).

	Goodness of fit statistics			
	Model 1: baseline <sup>a</sup>	Model 2: forward causation <sup>b</sup>	Model 3: reversed causation <sup>c</sup>	Model 4: bidirectional <sup>d</sup>
<b>Men</b>				
RMSEA	0.035	0.035	0.035	0.035
CFI	0.974	0.974	0.974	0.974
TLI	0.966	0.965	0.966	0.965
AIC	12,799.665	12,800.539	12,800.056	12,801.454
BIC	12,991.126	12,995.998	12,995.515	13,000.454
$\chi^2$	102.398	101.282	100.799	99.749
<i>df</i>	69	68	68	67
<i>p</i>	<0.01	<0.01	<0.01	<0.01
$\chi$ difference test				
Comparison with:	–	Model 1	Model 1	Model 1/Model 2/Model 3
Change in $\chi^2$	–	1.116	1.599	2.649/1.533/1.050
Change in <i>df</i>	–	1	1	2/1/1
<i>p</i>	–	0.29	0.21	0.27/0.22/0.31
<b>Women</b>				
RMSEA	0.047	0.048	0.046	0.046
CFI	0.953	0.953	0.957	0.957
TLI	0.938	0.937	0.942	0.942
AIC	12,563.657	12,564.541	12,114.797	12,560.148
BIC	12,753.163	12,757.995	12,319.549	12,757.550
$\chi^2$	128.442	127.326	122.109	120.933
<i>df</i>	69	68	68	67
<i>p</i>	<0.001	<0.001	<0.001	<0.001
$\chi$ difference test				
Comparison with:	–	Model 1	Model 1	Model 1/Model 2/Model 3
Change in $\chi^2$	–	1.116	6.333	7.509/6.393/1.176
Change in <i>df</i>	–	1	1	2/1/1
<i>p</i>	–	0.29	0.01	0.02/0.01/0.28

<sup>a</sup>Only auto-regressive effects and cross-sectional correlations.

<sup>b</sup>Friendship trust at T1 predicts psychological well-being at T2.

<sup>c</sup>Psychological well-being at T1 predicts friendship trust at T2.

<sup>d</sup>Friendship trust and psychological well-being have bidirectional effects.

The results suggest that men and women perceive higher friendship trust at age 23 than at age 19 years. This increase could indicate a growing capacity to engage in more close friendships when entering early adulthood [25]. In line with previous research [26], women’s ratings of well-being were persistently lower than those of men, but remained stable from age 19 to age 23 years. The reduced well-being of men at age 23 compared with age 19 years did not fall below the women’s ratings of well-being, but was nevertheless notable as it may point to the lowered resilience of men to cope with the potentially troublesome transition into adulthood.

The interdependence between trust and well-being was shown to differ notably between men and women. As the model comparison did not reveal any superior model in the sample of men, the baseline model without any cross-lagged pathways was retained for further analysis. More obvious differences emerged in the model comparison in the sample of women, with

the reversed causation assumption showing the best model fit. The subsequently used sex-specific models revealed associations between trust and well-being of equal size for men and women at age 19 years, which challenges previous research asserting that women react more sensitively to problematic social relationships of lower trust [27]. The diminished association between trust and well-being for men at age 23 years and the absent association for women at the same age question the strength of the link between the two dimensions. The included autocorrelation controls revealed that perceived trust and well-being in late adolescence are by far much stronger determinants for trust and well-being, respectively, in early adulthood.

The identified cross-lagged pathway in the sample of women may stem from reversed causation and thus indicate selection. In social network research, reversed causation is commonly regarded as evidence for selection, which denotes that individuals cluster

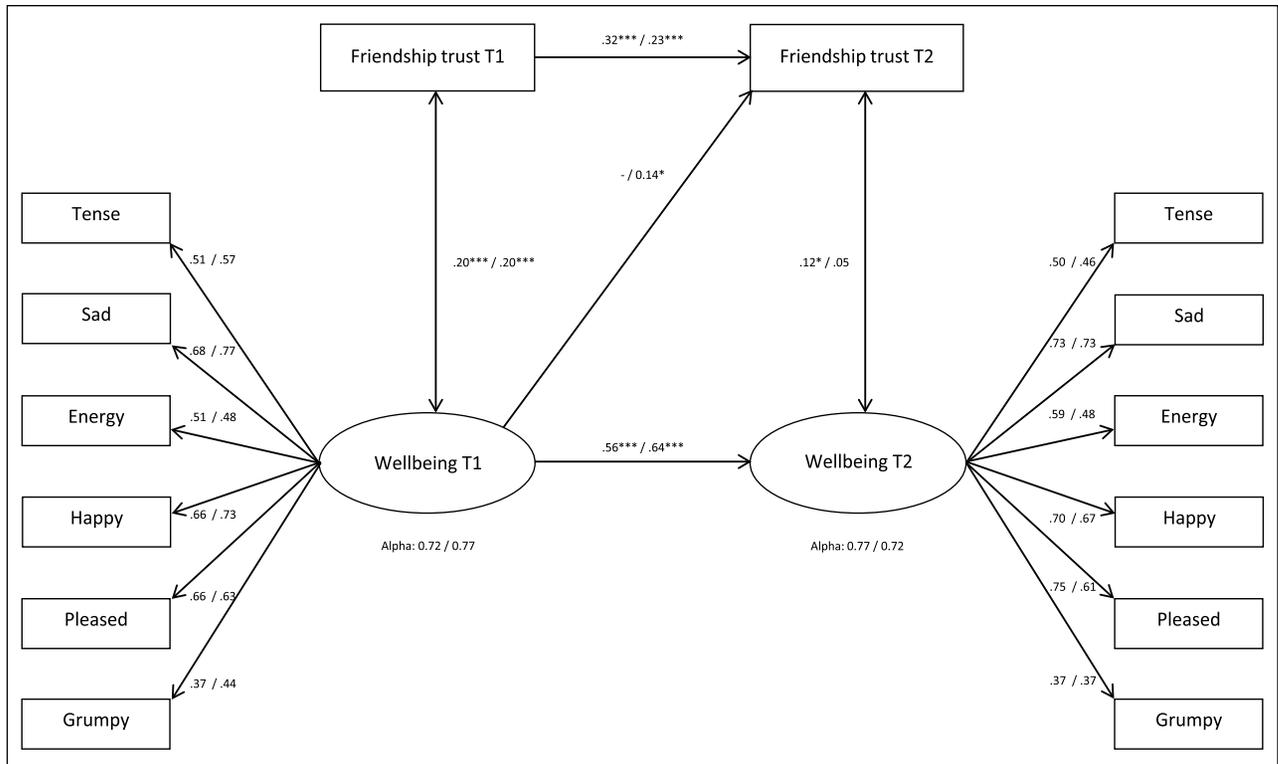


Figure 2. Associations between friendship trust and psychological well-being (men,  $n=399$ ; women,  $n=383$ ). Results from structural equation modelling. Estimates (standardized) are displayed as men/women. \*\*\*  $p<0.001$ , \*\*  $p<0.01$ , \*  $p<0.05$ .

to peers who are similar to themselves in terms of social behaviour, norms, and preferences [28]. In this study, for instance, it is possible that women with poorer well-being may have difficulties in building strong ties to other peers, which leads them to cluster to peers who also have reduced psychological well-being and thus self-select into low-trust relationships [29]. Another plausible explanation for reduced well-being could be peer rejection due to alters' lack of understanding and weak empathy [30].

The distinct sex-specific interdependence of trust and well-being could also point to differences in the form and content of social relationships among men and women. The reversed effect proposed for women may mirror a lowered ability to engage in trustful social relationships in adulthood, which can be explained by changes in their psychological well-being or health status during the transition period. As previously asserted in adolescent research, individuals with impaired well-being or health tend to create their own negative experiences [31]. The reduced psychological well-being of women may consequently inhibit their social functioning and impede their ability to engage in trustful social relationships [32,33]. Another explanation may reside in sex differences surrounding the mobilization of social

capital. The social ties of women tend to be characterized by higher degrees of reciprocity and intimacy [27], whereas men exhibit lower self-disclosure towards peers [22]. Similarly, men have been found to utilize more of the instrumental aspects of relationships (i.e. in terms of material and practical aid), whereas women seem to rely more on the intimate and interactive aspects of relationships [34]. As a result of women's tendency to be more emotionally involved in social relationships, they face more distress when friendships terminate [27], which could explain the complex, but nevertheless weak, correlation between trust and well-being in this study. The absence of a clear causal link between trust and well-being may descend from the age groups studied and the choice of outcome. Depending on living circumstances, trust and social capital fulfil different buffering functions for different age groups. Regarding working-age adults, for example, social capital is thought to mediate the effects of socio-economic position on health [35]. As psychosocial and biological mechanisms operate between trust and health, well-being may not respond in the same way as more pathological health measures [20]. The assessment of trust could also have contributed to the findings in this study.

### Strengths and limitations

A particular strength of this study is the use of ego-centric network data in combination with a two-wave panel design that tracked young peoples' transition into early adulthood. This period is particularly sensitive as aberrations occurring in this stage of life may carry forward and confine individuals' quality of life later on. Friendship nominations were limited to five alters and disregarded the fact that additional social contacts and friends could influence ego's well-being or the association between both dimensions. The sampling procedure, with a high proportion of non-response, resulted in a positively selected study sample. Sample attrition in the follow-up may have imposed an additional selection bias with an underrepresentation of perceived low well-being and low trust, reflecting that respondents with health problems and less supportive social networks may have been more likely to decline participation in the survey. The high non-response rate has implications for the representativeness of the results. However, if anything, the positive health selection would lead to a possible underestimation of the effects. Thus even stronger associations between trust and well-being would have been expected if the response rates had been higher. Confounding from unobserved or omitted covariates may have occurred. Additional control variables would, however, overcomplicate the structural equation model and obstruct its interpretations.

### Conclusions

This study identified distinct sex-specific pathways within the association between trust and well-being. For women, reversed causation with a lagged effect of well-being at age 19 years on trust at age 23 years was identified. The well-being and trust of women at age 23 years seems to be determined by the preceding interplay of trust and well-being in late adolescence. This may indicate that young women are particularly inclined to internalize the detrimental effects of prior dysfunctional social relations. By unravelling the sex-specific pathways from trust to well-being it was demonstrated that the associations between trust and well-being are far from straightforward because lagged effects and reversed causation contribute to the complex associations between both dimensions. From a policy perspective and in regard to future research directions, it is important to note that the well-being of men and women does not only respond differently to social interactions, but also that sex-specific approaches are needed to provide a more thorough understanding of the causal pathways and mechanisms involved.

### Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article. This study was financially supported by a Starting Grant from the European Research Council (grant no. 263422), the Swedish Council for Health, Working Life and Social Research (grants no. 2007-0806 and 2014-0387), and the Swedish Research Council.

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