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Effort–reward imbalance at work and risk of depressive disorders. A  
systematic review and meta-analysis of prospective cohort studies <sup>1</sup>

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*1 Electronic Appendix (e-Appendix)*

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<b>Contents</b>	<b>page</b>
<b>e-Appendix 1:</b> Search string for the electronic literature search	2
<b>e-Appendix 2:</b> Form for assessing the quality of the included studies	3
<b>e-Appendix 3:</b> Quality assessment of the eight included studies	4
<b>e-Appendix 4:</b> Random-effects meta-analysis of the least-adjusted study-specific estimates	5
<b>e-Appendix 5:</b> Post-hoc analyses repeating the three sensitivity meta-analyses from Figure 3 in the article after excluding study id# 08	6-8
<b>e-Appendix 6:</b> Changes in pooled estimates when partly overlapping studies were excluded	9

## **e-Appendix 1: Search string for the electronic literature search**

We searched published studies through a systematic review of the electronic databases PubMed (“All Fields”), PsychInfo (“Any Fields”) and Web of Science (“Topic”) from inception to October 1st, 2016, using the terms

- Effort AND Reward  
AND
- Depression OR Depressive OR Unipolar OR Antidepressant OR Dysthymia OR Dysthymic OR  
Dysphoria OR Dysphoric OR Affective OR Mood OR Mental OR Psychiatric  
AND
- Prospective OR Cohort OR Longitudinal OR Follow up

resulting into the following search string:

(Effort AND Reward) AND (Depression OR Depressive OR Unipolar OR Antidepressant OR Dysthymia OR Dysthymic OR Dysphoria OR Dysphoric OR Affective OR Mood OR Mental OR Psychiatric) AND (Prospective OR Cohort OR Longitudinal OR Follow up)

## e-Appendix 2: Form for assessing the quality of the included studies

### NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE COHORT STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability

#### Selection

- 1) Representativeness of the exposed cohort
  - a) truly representative of the average **\_workforce\_** (describe) in the community ✱
  - b) somewhat representative of the average **\_workforce\_** in the community ✱
  - c) selected group of users eg nurses, volunteers
  - d) no description of the derivation of the cohort
- 2) Selection of the non exposed cohort
  - a) drawn from the same community as the exposed cohort ✱
  - b) drawn from a different source
  - c) no description of the derivation of the non exposed cohort
- 3) Ascertainment of exposure
  - a) secure record (eg surgical records) ✱
  - b) structured interview ✱
  - c) written self report
  - d) no description
- 4) Demonstration that outcome of interest was not present at start of study
  - a) yes ✱
  - b) no

#### Comparability

- 1) Comparability of cohorts on the basis of the design or analysis
  - a) study controls for **sex** (select the most important factor) ✱
  - b) study controls for any additional factor (**socioeconomic status**) ✱

#### Outcome

- 1) Assessment of outcome
  - a) independent blind assessment ✱
  - b) record linkage ✱
  - c) self report
  - d) no description
- 2) Was follow-up long enough for outcomes to occur
  - a) yes (at least 12 monthst) ✱
  - b) no
- 3) Adequacy of follow up of cohorts
  - a) complete follow up - all subjects accounted for ✱
  - b) subjects lost to follow up unlikely to introduce bias - small number lost - **≥ 80% retained (<20% lost)** follow up, or description provided of those lost) ✱
  - c) follow up rate **<80% retained (≥20% lost)** and no description of those lost
  - d) no statement

For more information on the scale:

[http://www.ohri.ca/programs/clinical\\_epidemiology/oxford.asp](http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp) (accessed 28 June 2016)

## e-Appendix 3: Quality assessment of the eight included studies

**e-Table 1: Quality assessment of the eight included studies**

Study	Selection				Comparability	Outcome			Total rating	Quality <sup>a</sup>
	Representativeness of the exposed	Selection of non exposed	Ascertainment of exposure	Outcome of interest not present at start of study	Comparability of cohorts with regard to i) sex ii) socioeconomic position	Assessment of outcome	Lengths of follow-up	Adequacy of follow-up		
# 01 Kivimäki et al 2007 (39)	c)	a) ★	c)	a) ★	★★	c)	a) ★	c)	2+2+1 Stars	Low
# 02 Kivimäki et al 2007 (39)	c)	a) ★	c)	a) ★	★★	c)	a) ★	b) ★	2+2+2 Stars	Moderate
# 03, Wang et al 2012 (40)	b) ★	a) ★	c)	a) ★	★★	a) ★	a) ★	c)	3+2+2 Stars	High
# 04 Rugulies et al 2013 (41)	b) ★	a) ★	c)	a) ★	★★	c)	a) ★	c)	3+2+1 Stars	Low
# 05 Siegrist et al 2012 (42)	c)	a) ★	c)	a) ★	★★	c)	a) ★	d)	2+2+1 Stars	Low
# 06 Siegrist et al 2012 (42)	c)	a) ★	c)	a) ★	★★	c)	a) ★	d)	2+2+1 Stars	Low
# 07 Juvani et al 2014 (43)	c)	a) ★	c)	a) ★	★★	b) ★	a) ★	b) ★	2+2+3 Stars	Moderate
# 08 Nielsen et al 2016 (44)	b) ★	a) ★	c)	a) ★	★★	b) ★	a) ★	b) ★	3+2+3 Stars	High

<sup>a</sup>Categorized as:

High quality: 3 or 4 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome domain

Moderate quality: 2 stars in selection domain AND 1 or 2 stars in comparability domain AND 2 or 3 stars in outcome domain

Low quality: 0 or 1 star in selection domain OR 0 stars in comparability domain OR 0 or 1 stars in outcome domain

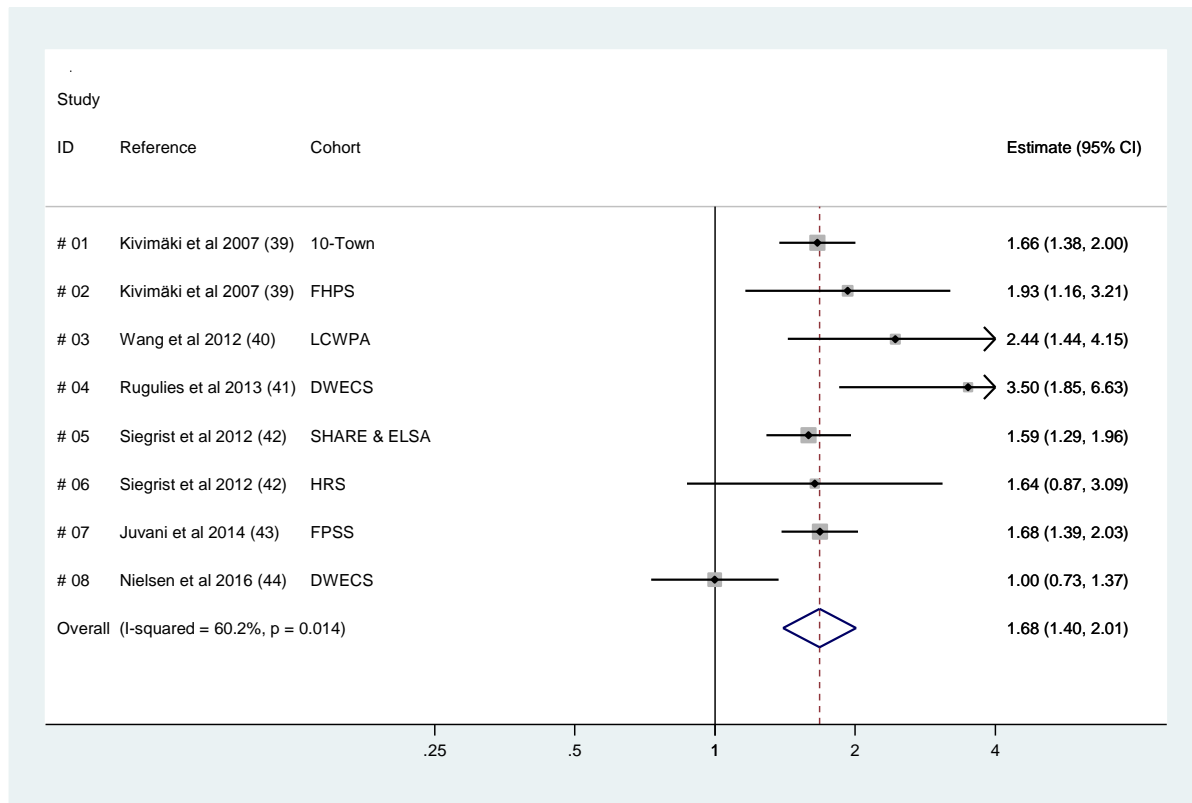
Note:

a), b), c) or d) refers to the quality assessment options of each numbered item of the Selection, Comparability and Outcome categories in the assessment form (see **e-Appendix 2**).

Wang et al 2012 (id #03) did not include sex in the most-adjusted model but had tested for sex in other analyses and therefore received a star for including sex.

## e-Appendix 4: Random-effects meta-analysis of the least-adjusted study-specific estimates

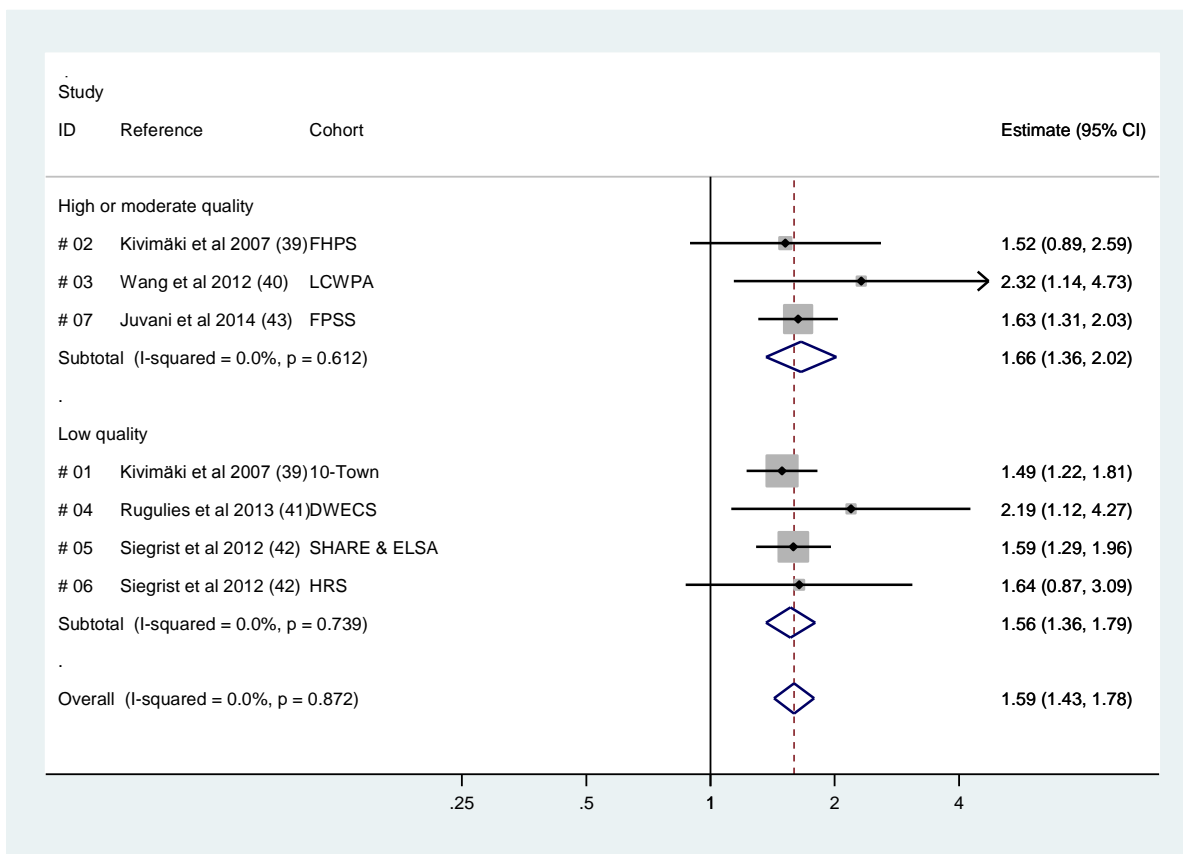
**e-Figure 1: Random-effects meta-analysis of the prospective association between effort-reward imbalance and onset of depressive disorders based on the least-adjusted study-specific estimates**



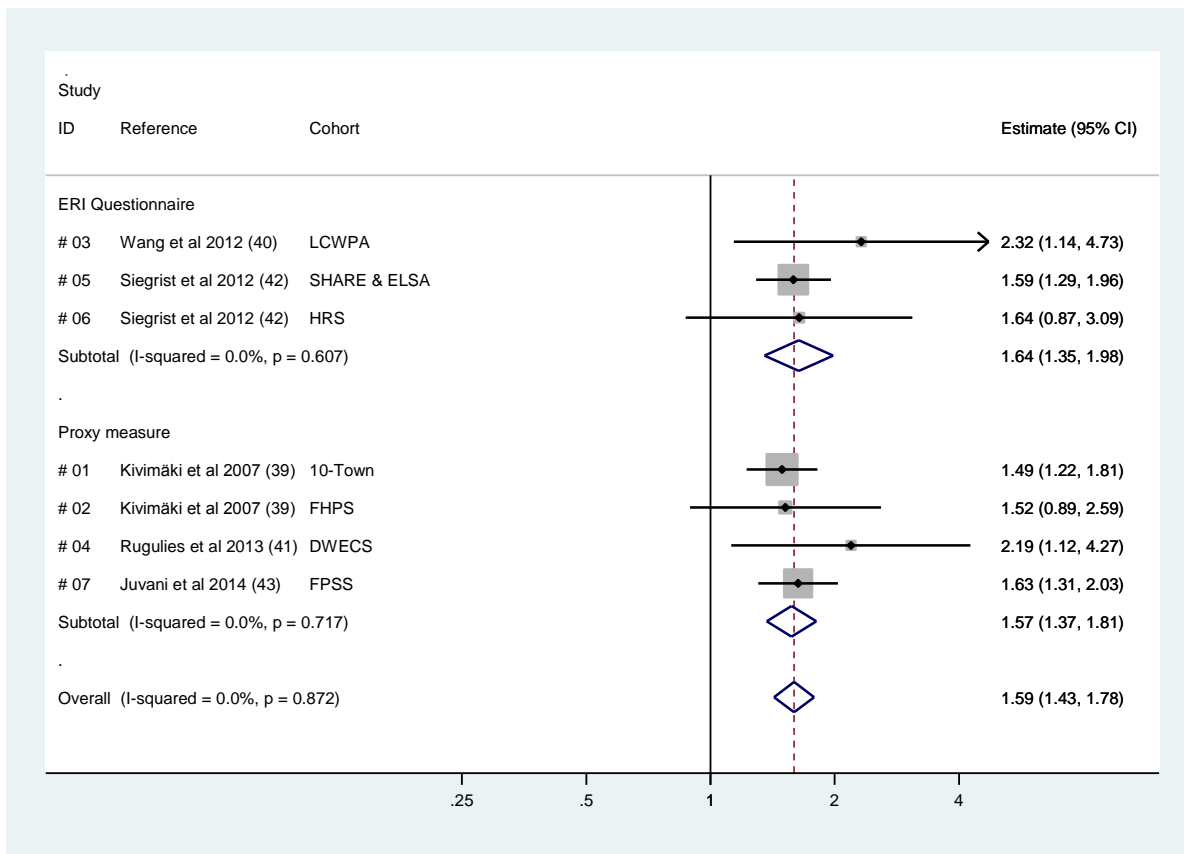
## e-Appendix 5: Post-hoc analyses repeating the three sensitivity meta-analyses in Figure 3 of the article after excluding study id# 08

**e-Figure 2: Random-effects meta-analyses (post-hoc, after excluding study id# 08) of the prospective association between effort-reward imbalance and onset of depressive disorders based on the most-adjusted study-specific estimates in relation to A) Study quality, B) Ascertainment of ERI, C) Ascertainment of depressive disorders**

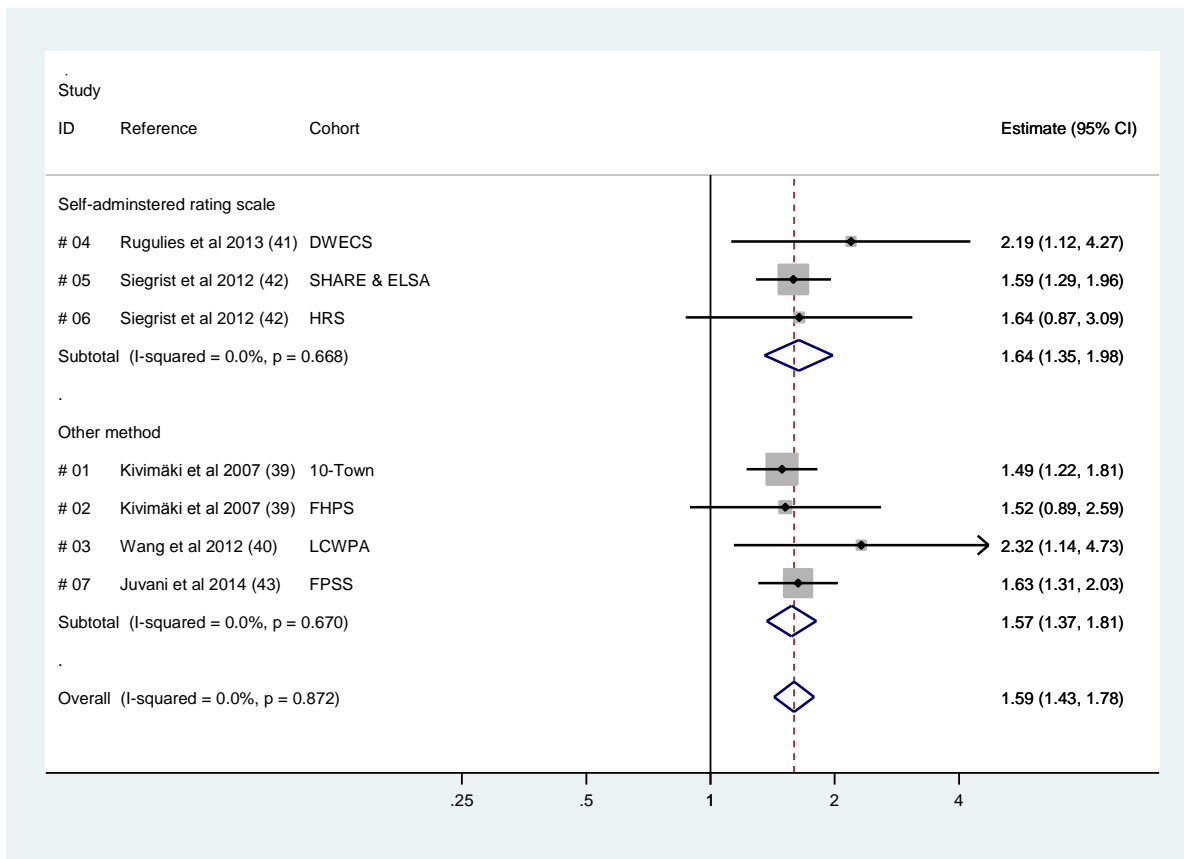
### A: Stratified by study quality



## B: Stratified by ERI ascertainment



### C: Stratified by depressive disorder ascertainment





## e- Appendix 6: Changes in pooled estimates when partly overlapping studies were excluded

**e-Table 2: Changes in pooled estimate when partly overlapping studies were excluded**

Exclusion of studies	Pooled estimate (95% CI)	$I^2$
All 8 studies included	1.49 (1.23-1.80)	59%
Excluding study id #01 and id #02 because of overlap with id #07	1.51 (1.13-2.00)	71%
Excluding study id #07 because of overlap with id #01 and id #02	1.47 (1.16-1.86)	63%
Excluding study id #04 because of overlap with study id #08	1.45 (1.19-1.77)	62%
Excluding study id #08 because of overlap with study id #04	1.59 (1.43-1.78)	0%

Estimates are based on random-effects meta-analysis