UPDATING THE EVIDENCE ON FCE

INTRODUCTION
INTRODUCTION

- **Workers leaving the labor market** due to health problems or disability
  - Social and economic impacts
  - Disability benefits: significant proportion of public expenditure
  - High social costs

- **Persons with reduced work capacity** are less likely to remain employed.
  - Employment rates of people with a disability are 40% lower

(OMD.; Andrén et al. 2001; Takala et al., 2014; Gouttebarge et al., 2004.)
INTRODUCTION

– **Changes** in the labor market

– **Growing awareness** about the return to work theme.
  – The number of people depending on sickness and disability benefits is still increasing.
  – The prevalence of occupational disabilities and related costs continue to increase.

(OECD.; Andrén et al. 2001; Takala et al., 2014; Gouttebarge et al., 2004.)
INTRODUCTION

– Need for increased investment in vocational rehabilitation
  ➔ To increase employment rates (including people with disabilities)

– Appropriate measurement tools.
  ➔ FCE instruments could play a key role

(Innes et al., 2012; Soer et al., 2008; Gross et al., 2005; Haglund et al., 1997.)
INTRODUCTION

- FCE ➞ functional evaluation of ‘work’ capacity
- By matching the capacities with the job requirements.

- Assumption: a better performance in the FCE is associated with
  - Faster return-to work
  - Lower risk of re-injury
  - Lower pain exacerbation.

(Innes et al., 2012; Soer et al., 2008; Gross et al., 2005; Haglund et al., 1997.)
METHODS
METHODS

- A systematic literature review
  - Web of science, Trip Database, Journal Storage, Pubmed, Embase, PEDro and OTSeeker.
- **Search string:**
  - (FCE) AND (psychometrics OR psychometric properties OR validity OR reliability) AND (return to work OR vocational rehabilitation OR JOB OR work participation)
- **2 independent researchers** selected the articles based on title and abstract.
  - Kappa statistics for agreement
- **Methodological Quality screening**
  - Three level quality appraisal scale (Gouttebarge, 2004)
RESULTS

Updating the evidence on Functional Capacity Evaluation - Stijn De Baets
Updating the evidence on Functional Capacity Evaluation – Dominique Van de Velde
RESULTS

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RESULTS

- 20 Articles
  - 16 studies: high quality
  - 3 moderate quality
  - 1 low quality
- Agreement between the two reviewers:
  - Kappa: 0.96 (SE=0.03; 95% CI 0.91-1.00)
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<td><strong>Author(s) and year of publication</strong></td>
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<td><strong>Studies on the Baltimore Therapeutic Equipment (BTE) work simulator</strong></td>
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<td>Cheng and Cheng [13]</td>
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<td>Cheng and Cheng [14]</td>
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<td><strong>Studies on the Blankenship WorkEval functional capacity evaluation</strong></td>
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<td>Gouttebarg et al. [15]</td>
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<td>Gouttebarg et al. [17]</td>
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<td><strong>Studies on the ERGOS work simulator (EWS)</strong></td>
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<td><strong>Studies on the Isernhaagen work systems (IWS) functional capacity evaluation</strong></td>
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<td>Gross and Battie [33]</td>
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<td>Reneman et al. [20]</td>
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<td><strong>Studies on the physical work performance evaluation (PWPE)</strong></td>
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<td>Brassard et al. [24]</td>
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<td>Durand et al. [27]</td>
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<td>Lechner et al. [26]</td>
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<td><strong>Studies on the short-form functional capacity evaluation</strong></td>
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<td>Brantley et al. [28]</td>
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<td><strong>Studies on the work disability functional assessment battery (WD-FAB)</strong></td>
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<td><strong>Studies on the WorkHab functional capacity evaluation</strong></td>
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<td>James et al. [30]</td>
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<td>James et al. [31]</td>
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# FCE METHODS

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<th>Method</th>
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<td>Baltimore Therapeutic Equipment (BTE)</td>
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<td>Ergokit</td>
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<td>Ergos Work Simulator</td>
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<td>Blankenship FCE</td>
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<td>Isernhagen Work – Systems (IWS)</td>
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<tr>
<td>The Physical Work Performance evaluation (PWPE)</td>
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<tr>
<td>Short – form FCE</td>
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<tr>
<td>Work Disability Functional Assessment battery (WD-FAB)</td>
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<td>Workhab</td>
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### Baltimore Therapeutic Equipment (BTE)

<table>
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<tr>
<th>FCE method</th>
<th>Short Description</th>
<th>Validity</th>
<th>Reliability</th>
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<tbody>
<tr>
<td>Baltimore Therapeutic Equipment (BTE)</td>
<td>A device used for evaluation and work hardening as well as regaining specific movements via attachments.</td>
<td>+/- Moderate predictive validity</td>
<td>/</td>
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- **No studies on reliability**
  - **Moderate** predictive validity for return-to-work and employment status
## ERGOKIT

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<tr>
<td>Ergokit</td>
<td>Measures the construct physical work capacity. There are 19 work skills assessed, such as manual testing, strength tests and physical agility. In addition, the consistency in the mutual test results is assessed.</td>
<td>+ High convergent validity Low to moderate concurrent Validity</td>
<td>+ High inter- and intra-rater reliability</td>
</tr>
</tbody>
</table>

- **1 study on intra & interrator reliability.**
  (Gouttebarge et al., 2005; Gouttebarge et al., 2006)
- **1 study on the discriminant, divergent and convergent validity.**
  (Gouttebarge et al., 2009)
- **1 study on the concurrent validity of the EK & ERGOS.**
  (Rustenburg et al., 2004)
  - **Moderate** variability between outcomes on the lifting tests.
  - Agreement between & within raters strongly varied for the lifting tests of the EK from low to high, but was mostly high.
  - **Low** discriminative abilities (validity) were found for the EK
ERGOS WORK SIMULATOR

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**ERGOS WORK SIMULATOR**

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<tr>
<td>Ergos Work Simulator</td>
<td>A ‘work simulator’ that measures whether and to what extent you perform certain actions that are required in your job/line of work.</td>
<td>- Low to moderate concurrent validity</td>
<td>/</td>
</tr>
</tbody>
</table>

- **No** studies on the reliability.
- **1 study** on the concurrent validity in comparison with the Ergo-Kit. (Rustenburg et al., 2004)
  - A low to moderate concurrent validity compared to the EK.
Updating the evidence on Functional Capacity Evaluation - Stijn De Baets
### BLANKENSHIP FCE

<table>
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<tbody>
<tr>
<td>Blankenship FCE</td>
<td>Provides the essential components for determining safe working abilities for all musculoskeletal disorders.</td>
<td>/</td>
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</table>

- **No** studies were found on the **reliability or validity**
- **1** was found on the sensitivity and specificity (Brubaker et al., 2007)
  - Sensitivity of **80.0%** and specificity of **84.2%**
  - Indicates **good diagnostic abilities**
A varying test–retest reliability and reproducibility in the material-handling component.  
(Reneman, et al., 2004)

- Provides relatively stable outcomes with limited variation.  
(Reneman, et al., 2005)

- Agreement between raters was moderate for the lifting tests  
(Reneman, et al., 2005)

- Moderate to high agreement between raters was found for the physical and behavioral scale.  
(Tripolini et al., 2014)

- Performance in the IWS (number of failed tasks and weight lifted) has no or low predictive value for recovery outcomes.  
(Soer et al., 2008)
PHYSICAL WORK PERFORMANCE EVALUATION

<table>
<thead>
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<tbody>
<tr>
<td>The physical work Performance evaluation (PWPE)</td>
<td>A specialised evaluation of a person’s physical ability to perform work activities.</td>
<td>+ High predictive validity</td>
<td>+/- Moderate test–retest reliability and moderate to high inter-rater reliability.</td>
</tr>
</tbody>
</table>

– Provides relatively stable outcomes with limited variation.
  (Brassard et al., 2006 & Durand et al., 2004)

– Agreement between raters was moderate to high for the PWPE sections and high for the overall PWPE score.
  (Durand et al., 2008)

– Performance in the PWPE has a high predictive value in return to work.
  (Lechner et al., 2008)
Speaker: Stijn De Baets

**SHORT FORM FCE**

<table>
<thead>
<tr>
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<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short – form FCE</td>
<td>FCE measures included items in the Isernhagen Work Systems’ FCE.</td>
<td>+ High predictive validity</td>
<td>/</td>
</tr>
</tbody>
</table>

- **No** studies on the *reliability*
- **1** article on its *predictive validity* (Branton et al., 2010)
- The performance items in the short-form FCE have a predictive value for recovery outcomes such as timely and sustained return-to-work.
WORK DISABILITY FUNCT ASSESSMENT BATTERY

<table>
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<tbody>
<tr>
<td>Work disability functional Assessment battery (WD-FAB)</td>
<td>Physical and mental function domain are analysed and compared to the general population.</td>
<td>- Low discriminative and convergent validity</td>
<td>/</td>
</tr>
</tbody>
</table>

- No studies on the **reliability**
- 1 study on the **discriminant / divergent and convergent validity**. (Meterko et al., 2015)
- Good discriminative abilities
  - physical functioning
  - behavioral health scales.
WORKHAB

<table>
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<th>Reliability</th>
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<tbody>
<tr>
<td>Workhab</td>
<td>A system of determining functional capabilities for return to work, pre-hire/post-offer, activities of daily living, or medical case management.</td>
<td>/</td>
<td>+ Moderate to high test-retest, inter- and intra-rater reliability</td>
</tr>
</tbody>
</table>

– Moderate to high agreement between outcomes in the three subtests of the WorkHab manual handling component
  (Meterko et al., 2015)

– High agreement between outcomes on the overall manual handling score.
  (James et al., 2011)

– Stable outcomes with little variation.
  (James et al., 2010)

– Agreement within raters was moderate to high for the subtests and high for the overall manual handling component.
  (James et al., 2011)
DISCUSSION

– Overall, the psychometric properties of the studied FCE methods somewhat vary between & within methods.
– Used to predict, establish or diagnose work abilities, time of recovery & RTW?

– Reliability

– Validity
DISCUSSION

– Also look at:
  – Practicality
  – Utility
  – Costs
  – Time spent
  – User-friendliness
  – Acceptability
DISCUSSION

- Short-form FCE’s provide a potential answer to many problems.
- but the psychometrics need more scientific substantiation.

- 2/3 of the experts found FCE useful
  - Confirm personal judgements
  - Provide objective information.

- Reasons for not finding FCE useful
  - It did not seem objective
  - Did not provide any new information.
DISCUSSION

- RTW has become a central aspect on political & clinical level.
  - Improvement in the prediction of RTW could have a huge potential
  - For vocational rehabilitation workers
  - To inform policy makers in their RTW policy.
DISCUSSION

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DISCUSSION

– Provided a more extensive and updated representation of the psychometric qualities of several FCE methods.

– Some more ground has been covered on the better known FCE methods

– New methods with different approaches are on the rise and gaining scientific support as well. ➔ Need to be further examined.
Updating the Evidence on Functional Capacity Evaluation Methods: A Systematic Review

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Occupational Therapy Program

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INTRODUCTION

- Bio-psycho social reasoning
- Client centeredness
- Psychological and social factors concerning labor.
idem niet voorkeur
Vingervaardigheid
idem niet voorkeur
Hanteren
Overige vaardigheden
Tijdsduur in % van een werkdag
Normaal
Belastbaarheid
Zitten
Staan
Wandelen
Klimmen
Traplopen
Bukken
Knielen
Hurken
Kruipen
Reiken hoog
Reiken laag
Hanteren
idem niet voorkeur
Vingervaardigheid
idem niet voorkeur