Emotional competence and health: Relationships, pathways and interventions

Pr Moïra Mikolajczak

Gent, November 26 2014
Outline

• Emotional intelligence – emotional competence
• Why is EC important?
• The impact of EC on physical health
• Behavioral and biological mediators of the relationship between EC and health
• Methods and efficiency of interventions to improve EC
I. Emotional intelligence – emotional competence
Emotional competence (EC) or Emotional intelligence (EI)?

I do not mind the term EI but I feel a little more comfortable with the term EC (less “rigid”, more coherent with the fact that EC can be improved via –event short- trainings)

→ I will use both terms interchangeably
Emotional intelligence: ability or trait?

I personally think that it is a wrong debate. It can be both

→ Integrative model to reconcile perspectives*:
  three levels of EC: knowledge, abilities and traits

Knowledge level: what people know about emotions and emotional competencies (e.g. Do I know how to express my emotions constructively?).

Ability level: ability to apply this knowledge in an emotional situation (e.g., Am I able to express my emotions constructively?). (even though many people know they should not shout when angry, there are unable not to do so)

Trait level: propensity to behave in a certain way in emotional situations (Do I typically express my emotions in a constructive manner?). Some individuals might be able to express their emotion constructively if explicitly asked to do so, but they do not manage this spontaneously.

Emotional intelligence: which dimensions?

I like to think of EI/EC as encompassing five core dimensions: the four dimensions proposed by Mayer & Salovey (1997), in which the identification/expression dimension is broken down in two.

I personally believe that all dimensions should be measured distinctly for one’s and others’ emotions (most EI measures simply mix and confound intra- and inter-personal perspectives) (e.g. TEIQue; MSCEIT: identification is only measured regarding others’ emotions; regulation is only measured regarding one’s own emotions)

*Brasseur, Grégoire, Bourdu & Mikolajczak, 2013, PloS ONE*
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</tr>
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<td>Inter-personal EC/EI</td>
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<td></td>
<td></td>
<td>Global EC/EI</td>
</tr>
</tbody>
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II. Why care about EI/EC?
Why is EI/EC important?
The importance of emotional competence

- **Quality of relationships (social & marital)**
  - Schutte et al. 2001
  - Malouff, Schutte, Thorsteinsson, 2014

- **Work performance (academic & occupational)**
  - O’Boyle et al., 2011

- **Mental health & well-being**
  - Martins, Ramalho & Morin, 2010

- **Physical health**
  - ?
The importance of emotional competence

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Emotional Competence

Physical health
  ?
Theoretical background

Schutte et al. (2007) and then Martins et al (2010)’s meta-analyses suggest that EI is a reliable predictor of physical health ($r = -.22$ in Schutte & al.; $r = - .27$ in Martins & al.).

However, all studies included in these meta-analyses rely on self-reported criteria.

No study to date has ever investigated the link between EI and objective indicators of general health status.
Goals of the National EC-Health study*

STUDY 1

- To examine the relationship between EI and objective indicators of health (healthcare use)
- To quantify the predictive power of EI relatively to already known predictors of health

STUDY 2

- To replicate Study 1’s findings
- To clarify the relative weight of the various EI dimensions
- To determine to what extent EI moderates the effect of known predictors on health

*Mikolajczak, Avalosse, Vancorenland et al. in press, Emotion
## Method (1/2)

<table>
<thead>
<tr>
<th></th>
<th>STUDY 1</th>
<th>STUDY 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N contacted</td>
<td>10,000 (by mail)</td>
<td>200,000 (by email)</td>
</tr>
<tr>
<td>(stratified sample on</td>
<td></td>
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<tr>
<td>gender, age, SES,</td>
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<tr>
<td>province)</td>
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</tr>
<tr>
<td>N¹</td>
<td>1646 (±16%)</td>
<td>16,999 (±8%)</td>
</tr>
<tr>
<td>N² ( = ) final sample</td>
<td>1310 (±13%)</td>
<td>9,616 (±5%)</td>
</tr>
<tr>
<td>Measures:</td>
<td>over the last 11 years</td>
<td>over the last 12 years</td>
</tr>
<tr>
<td>Mutual Benefit</td>
<td>*Number of visits to doctors (+ expenses)</td>
<td>*Number of visits to doctors (+ expenses)</td>
</tr>
<tr>
<td>Society’s record</td>
<td>*Number of days spent in hospitals (+ expenses)</td>
<td>*Number of days spent in hospitals (+ expenses)</td>
</tr>
<tr>
<td></td>
<td>*Number of Defined Daily Dose (DDD) (+ expenses)</td>
<td>*Number of Defined Daily Dose (DDD) (+ expenses)</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>See next slide</td>
<td></td>
</tr>
</tbody>
</table>

N¹ = people who answered the whole questionnaire and gave their consent for coupling the data
N² = N¹ who have been member of the Mutual Benefit Society for the whole period
<table>
<thead>
<tr>
<th>Questionnaire</th>
<th><strong>STUDY 1</strong></th>
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<tbody>
<tr>
<td></td>
<td>*Demographics  <em>(gender, age, level of education, language, province, marital and family status,...)</em></td>
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</tr>
<tr>
<td></td>
<td><em>Body Mass Index</em></td>
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</tr>
<tr>
<td></td>
<td><em>EI (TEIQUE-SF; Petrides et al.)</em></td>
<td><em>EI (PEC; Brasseur et al.)</em></td>
</tr>
<tr>
<td></td>
<td><em>Trait affectivity (extended PANAS)</em></td>
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</tr>
<tr>
<td></td>
<td>*Social support  <em>(two items: concrete, emotional)</em></td>
<td>*Social support  <em>(two items: concrete, emotional)</em></td>
</tr>
<tr>
<td></td>
<td>*Health behaviors  <em>(diet, exercise, smoking, drinking)</em></td>
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</tr>
<tr>
<td></td>
<td>*Non reimbursed drugs  <em>(painkillers, vitamins, muscles cream,...)</em></td>
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</tr>
<tr>
<td></td>
<td>*Non reimbursed services  <em>(accupuncture)</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Relaxing practices  <em>(meditation, relaxation, yoga, ...)</em></td>
<td></td>
</tr>
</tbody>
</table>


The Profile of Emotional Competence (PEC): Development and Validation of a Self-Reported Measure that Fits Dimensions of Emotional Competence Theory

Sophie Brasseur¹*, Jacques Grégoire², Romain Bourdu³, Moïra Mikolajczak²

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<th>Intra-personal EC Score</th>
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Global EC Score 50

Translations in Dutch, English, Spanish, Basque, Portuguese, Romanian, and Japanese.
Results


Pre-press available on Research Gate or on my lab website (I-Lab at UCLouvain)
## Results Study 2

<table>
<thead>
<tr>
<th></th>
<th>Non-reimbursed drugs</th>
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<tr>
<td>Age</td>
<td>.03 **</td>
<td>.27 ***</td>
<td>.20 ***</td>
<td>-.04 ***</td>
<td>.03 *</td>
<td>-.06 ***</td>
</tr>
<tr>
<td>Sex</td>
<td>-.21 ***</td>
<td>.03 *</td>
<td>-.11 ***</td>
<td>-.04 ***</td>
<td>-.01</td>
<td>-.01</td>
</tr>
<tr>
<td>Education</td>
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<td>-.03 *</td>
<td>-.10 ***</td>
<td>.06 ***</td>
<td>-0.03 *</td>
<td>-.01</td>
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<tr>
<td>BMI</td>
<td>.02 **</td>
<td>.17 ***</td>
<td>.05 ***</td>
<td>.02 †</td>
<td>.01</td>
<td>.03 *</td>
</tr>
<tr>
<td>Soc.Sup.</td>
<td>-.08 ***</td>
<td>-.05 ***</td>
<td>-.07 ***</td>
<td>-.04 **</td>
<td>-.04 **</td>
<td>-.03 *</td>
</tr>
<tr>
<td>Diet Hab.</td>
<td>.05 ***</td>
<td>.07 ***</td>
<td>.04 ***</td>
<td>.01</td>
<td>.00</td>
<td>-.01</td>
</tr>
<tr>
<td>Phys. Activity</td>
<td>.00 **</td>
<td>-.13 ***</td>
<td>-.09 ***</td>
<td>-.02</td>
<td>-.08 ***</td>
<td>-.02</td>
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<tr>
<td>Tob &amp; Alc</td>
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<td>.01</td>
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</tr>
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<td>EC Intra</td>
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<td>-.13***</td>
<td>-.10***</td>
<td>-.06***</td>
<td>-.03*†</td>
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<td>.08***</td>
<td>.05***</td>
<td>.01</td>
<td>-.03*</td>
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**Note.** DDD = Daily Defined Doses; GP = General Practitioner; SP = Specialized Practitioner.  
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</tr>
</tbody>
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**Betas for:**

- **Age**: 0.03**
- **Sex**: -0.21***, 0.03*
- **Education**: -0.05***, -0.03*
- **BMI**: 0.02, 0.17***
- **Soc.Sup.**: -0.08***, -0.05***
- **Diet Hab.**: 0.05***, 0.07***
- **Phys. Activity**: 0.00, -0.13***
- **Tob & Alc**: -0.01, 0.01, 0.05***
- **EC Intra**: -0.14***, -0.10***, -0.13***, -0.10***
- **EC inter**: 0.08***, 0.04**, 0.08***, 0.05***

**Note.** DDD = Daily Defined Doses; GP = General Practitioner; SP = Specialized Practitioner. **p ≤ 0.001; *p ≤ 0.01; *p ≤ 0.05**
Correlations are admittedly small…but health is the product of multiple bio-psycho-social factors in interaction…

Yet, small correlations…. Can have important financial consequences…

✅ In Belgium (11,000,000 inhabitants), people with intrapersonal EC < median cost 2 billion EUR more per year to the social security than people with intrapersonal EC > median.

✅ The elasticity coefficient of intrapersonal EC on healthcare expenses is 1 (0.99 precisely), which means that a 1% increase in intrapersonal EC translates into a 1% decrease in healthcare expenses.
## Results Study 2: facet level

<table>
<thead>
<tr>
<th></th>
<th>Drugs Mean DDD</th>
<th>Hospitalization (days spent in all types of hospitals)</th>
<th>Consultation (mean visits to GP or SP)</th>
<th>Consultation To psychiatrist</th>
<th>Non reimbursed Medicine</th>
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<tbody>
<tr>
<td>Identification self</td>
<td>-.09</td>
<td>-.06</td>
<td>-.08</td>
<td>-.06</td>
<td>-.05</td>
</tr>
<tr>
<td>Identification other</td>
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<td>-.05</td>
<td>-.07</td>
<td>.03</td>
<td>.03</td>
</tr>
<tr>
<td>Expression self</td>
<td>-.11</td>
<td>-.06</td>
<td>-.09</td>
<td>-.06</td>
<td>-.07</td>
</tr>
<tr>
<td>Listen other</td>
<td>-.02</td>
<td>.00</td>
<td>.03</td>
<td>.03</td>
<td>.04</td>
</tr>
<tr>
<td><strong>Understanding self</strong></td>
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<td><strong>-.10</strong></td>
<td><strong>-.13</strong></td>
<td><strong>-.08</strong></td>
<td><strong>-.10</strong></td>
</tr>
<tr>
<td>Understand. other</td>
<td>-.12</td>
<td>-.08</td>
<td>-.10</td>
<td>.04</td>
<td>.00</td>
</tr>
<tr>
<td><strong>Regulation self</strong></td>
<td><strong>-.09</strong></td>
<td><strong>-.07</strong></td>
<td><strong>-.12</strong></td>
<td><strong>-.17</strong></td>
<td><strong>-.16</strong></td>
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<tr>
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<td>-.01</td>
<td>-.03</td>
<td>-.02</td>
<td>-.01</td>
</tr>
<tr>
<td>Use self</td>
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<td>-.03</td>
<td>-.03</td>
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<td>.11</td>
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<tr>
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<td>-.05</td>
<td>-.10</td>
<td>-.05</td>
<td>-.07</td>
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<tr>
<td>Intrapersonal EC</td>
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<td>-.09</td>
<td>-.09</td>
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<tr>
<td>Interpersonal EC</td>
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<td>-.05</td>
<td>-.08</td>
<td>.01</td>
<td>.00</td>
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<td><strong>Global EC</strong></td>
<td><strong>-.14</strong></td>
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<td><strong>-.11</strong></td>
<td><strong>-.05</strong></td>
<td><strong>-.05</strong></td>
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Note. Significant correlations after bonferroni correction are bolded.
Study 2: Does EI moderate the effect of known predictors on healthcare consumption? A systematic test of moderation effects

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<th>Hospitalization (days spent in all types of hospitals)</th>
<th>Consultation (mean visits to GP or SP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>F (1,9319) = 7.39**</td>
<td>F (1,9319) = 1.88</td>
<td>F (1,9319) = 2.28</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>F (1,9613) = 18.94***</td>
<td>F (1,9613) = 9.31**</td>
<td>F (1,9613) = 0.61</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>F (1,9556) = 2.23</td>
<td>F (1,9556) = 4.92*</td>
<td>F (1,9556) = 6.46*</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>F (1,9571) = 8.90**</td>
<td>F (1,9571) = 6.85**</td>
<td>F (1,9571) = 3.64* (.057)</td>
</tr>
<tr>
<td><strong>BIM</strong></td>
<td>F (1,9613) = 8.99**</td>
<td>F (1,9613) = 47.21***</td>
<td>F (1,9613) = 1.33</td>
</tr>
<tr>
<td><strong>Physical Activity</strong></td>
<td>F (1,9613) = 3.25@</td>
<td>F (1,9613) = 41.74***</td>
<td>F (1,9613) = 3.61* (.057)</td>
</tr>
<tr>
<td><strong>Social support</strong></td>
<td>F (1,9613) = 0.46</td>
<td>F (1,9613) = 53.54***</td>
<td>F (1,9613) = 0.41</td>
</tr>
</tbody>
</table>
Profile of EI interaction on drug use

Over 12 years, an old person with low EI has taken 2000 more doses (± 170 more a year) than an old person with high EI.
Profile of EI interaction on hospitalization

Over 11 years, a person with low physical activity and low EI has been hospitalized 25 more days than a person with low physical activity and high EI (thrice as much!) → high EI compensates for low physical activity

Note that in this case, high physical activity can compensate for low EI
III. How does EC influence health?
Behavioral and biological pathways
Behavioral and biological pathways

Behavioral and biological pathways include:
- Reckless driving
- Self-harm
- Substance abuse
- Physical activity
- Diet habits
- Neuroendocrine activation
- DNA damage
- Intestinal permeability

These behaviors are linked to:
- Accident
- Disease
Behavioral pathways

- Violent behavior
- Self-harm
- Substance abuse
- Physical activity
- Diet habits
- Neuro-endocrine activation
- DNA damage
- Intestinal permeability

EC

Behavior

Biological

Accident

Disease
EI is negatively related to behaviors* that have damaging consequences on health

*probably used as a way to defuse emotional tension or anesthetize feelings

Brackett & Mayer 2003
Winters, Clift & Dutton, 2004
Mikolajczak, Petrides & Hurry, 2009
Schutte, Malouff & Hine, 2011
Markey & Vander Wal, 2007
EI is negatively related to behaviors that have damaging consequences on health.

- Violent behavior
- Self-harm
- Substance abuse
- Accident

Behavior

- Accidents, infections
- Cancer
  - Liver disease
  - Pancreatic disease
  - Neurologic disorders

- Obesity
- Diabetes
- Gastro-intestinal disorders

Brackett & Mayer, 2003
Winters, Clift & Dutton, 2004
Mikolajczak, Petrides & Hurry, 2009
Schutte, Malouff & Hine, 2011
Markey & Vander Wal, 2007
EI is positively related to behaviors that are beneficial for health.

Saklofske et al., 2007
Mikolajczak et al., in press
Biological pathways

EC

Behaviors

Violent behavior
Self-harm
Substance abuse
Physical activity
Diet habits

Neuro-endocrine activation
DNA damage
Intestinal permeability

Disease

Accident
Biological pathways

- EC
- Behaviors
- Biological
- Violent behavior
- Self-harm
- Substance abuse
- Physical activity
- Diet habits
- Neuro-endocrine activation
- DNA damage
- Intestinal permeability
- Accident
- Disease
A. The neuroendocrine pathway*

Neuroendocrine activation:
- Provides the organism with the energy to deal with challenging situations
- Adaptive in the short term, maladaptive when long-lasting

* Sympathetic nervous system and hypothalamo-pituitary-adrenal axis activation
A. The neuroendocrine pathway

* Sympathetic nervous system and hypothalamo-pituitary-adrenal axis activation
A. The neuroendocrine pathway

* Sympathetic nervous system and hypothalamo-pituitary-adrenal axis activation
A. The neuroendocrine pathway

* Sympathetic nervous system and hypothalamo-pituitary-adrenal axis activation
A. The neuroendocrine pathway

[Diagram showing sympathetic nervous system and hypothalamo-pituitary-adrenal axis activation]

- Muscle tension
- Heart rate
- Sugar
- Digestion
- Immune system
- Reproductive function

**Acute activation**
- Back pain
- Hypertension
- Hyperglycaemia
- Gastro-intestinal disorders
- Vulnerability to viruses
- Sexual dysfunction

**Exaggerated chronic activation**

*Sympathetic nervous system and hypothalamo-pituitary-adrenal axis activation*
Sample study*

56 healthy young men (18-25 years old) exposed to a challenging situation (cortisol measured throughout)

The participant was filmed during the interview and his image was retransmitted behind the jury

Standardized stressful interview by a mixed-gender jury

Serious and severe member of the jury

*Mikolajczak, Roy, Luminet, Fillée, & de Timary (2007) Psychoneuroendocrinology
56 healthy young men (18-25 years old) exposed to a challenging situation (cortisol measured throughout)

Indicator of neuroendocrine activation (HPA axis)

Low EC: Exaggerated neuroendocrine activation

*Mikolajczak, Roy, Luminet, Fillée, & de Timary (2007) Psychoneuroendocrinology*
Biological pathways

- Violent behavior
- Self-harm
- Substance abuse
- Physical activity
- Diet habits
- Neuro-endocrine activation
- DNA damage
- Intestinal permeability
- Accident

- EC
- Behaviors
- Biological
- Disease
(B) The DNA damage pathway

- Protect DNA
- Vitamine E
- Vitamine C

- Damage DNA
- Stress!
- Food colouring
- Tobacco

Health vs Disease
The neuro-biological pathway
(B) DNA damage* New!

Health:
DNA damage <
DNA repair capacity

Disease:
DNA damage > DNA repair capacity
Sample Study (in progress)

How big is the influence of EC on DNA damage?

- Exploratory study on 120 adults (age range: 20-55)
- Measures

<table>
<thead>
<tr>
<th>Psychological factors</th>
<th>DNA damage indicators</th>
</tr>
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<tbody>
<tr>
<td>• Emotional competence</td>
<td>• General indicators of DNA damage</td>
</tr>
<tr>
<td>• Big Five Personality factors</td>
<td>• Specific indicators of damage on particular genes</td>
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</tr>
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<td>• Happiness</td>
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Sample Study (in progress)

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Biological pathways

- Violent behavior
- Self-harm
- Substance abuse
- Physical activity
- Diet habits
- Neuro-endocrine activation
- DNA damage
- Intestinal permeability

EC

Behaviors

Biological

Disease

Accident
Stress and negative emotions increases the permeability of the intestine barrier
→ unwanted and/or toxic molecules enter the organism
→ lead to multiple inflammation, implicated in the etiology of several autoimmune diseases (Type 1 diabetes, arthritis, Crohn’s disease, Celiac disease,...)
EC and intestinal permeability*

<table>
<thead>
<tr>
<th>VI</th>
<th>VD</th>
</tr>
</thead>
<tbody>
<tr>
<td>- EI (TEIQue)</td>
<td>- Intestinal permeability</td>
</tr>
<tr>
<td>- Neuroticism</td>
<td>(small intestine, colon, total)</td>
</tr>
<tr>
<td>- Extraversion</td>
<td>- Inflammation (tnfα,</td>
</tr>
<tr>
<td>- Openness</td>
<td>interleukines, ...)</td>
</tr>
<tr>
<td>- Conscientiousness</td>
<td>...</td>
</tr>
<tr>
<td>- Agreeability</td>
<td></td>
</tr>
<tr>
<td>- Depression</td>
<td></td>
</tr>
<tr>
<td>- Anxiety</td>
<td></td>
</tr>
</tbody>
</table>

Preliminary results: EI is negatively related to intestinal permeability (correlations > .40)

*Leclerq, Delzenne, Mikolajczak, Starkel, de Timary, in preparation*
Behavioral and biological pathways

EC

Behaviors

Violent behavior
Self-harm
Substance abuse
Physical activity
Diet habits
Neuroendocrine activation
DNA damage
Intestinal permeability

Disease

Accident

Biological

???
IV. Improving EC/EI in order to improve health?
## Improving EI to improve health?

<table>
<thead>
<tr>
<th>LLN Study*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td><strong>Sample</strong></td>
</tr>
<tr>
<td><strong>Measures</strong></td>
</tr>
</tbody>
</table>

*Kotsou, Grégoire, Nelis, & Mikolajczak, 2011, *Journal of Applied Psychology*
LLN Study (working adults)

Difference between Time 1 and time 2 (in %)

- EC
- Ability EC
- EC informant

Experimental group
Control group
LLN Study (continuing)

Y axis = Difference between Time 1 and time 2 (in %)
Improving EI to improve health?

✓ These effects not only attributable to a group effect: drama improvisation does not have the same effects

✓ All the effects hold after 6 months and 1 year

✓ These results have now been replicated several times, with both young and older adults, as well as gifted adolescents.

✓ We are now testing the efficiency of EI training in several health conditions (e.g. migraine, myocardial infarction). We have already found that EC training reduces the frequency of migraine attacks and improve migraineurs’ quality of life.

---

a Nelis, Kotsou, Quoidbach, Dupuis, Weytens, Hansenne & Mikolajczak (2011) Emotion

Thank you for your attention

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- Université catholique de Louvain
More about the theory and content of the training