EXERCISING CRITICAL REFLECTION: measuring the relationship between **BDNF** and **TLEs**

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EXERCISING CRITICAL REFLECTION:

Exercise boosts brain power, according to neuroscience research. And brain power is responsible for constructing increasingly accurate perspectives through critical reflection on disorienting trigger events.

This study analyzes the relationship between exercise and transformative learning among undergraduates, as measured by a learning experiences questionnaire informed by emerging insights into education neuroscience.

This project synthesizes findings from brain research (Begley, 2008; Doidge, 2007; Dragansky, 2004; Fisher & Heikkinen, 2010; Medina, 2008; Ratey, 2008, Restak, 2007; Siegel, 2010; Sousa, 2010; Zull, 2011) and transformative learning research (Brookfield, 2000; Herbers, 1998; King, 1997; Mezirow, 1978; Mezirow, 2000; Mezirow and Taylor, 2009; Taylor, 2000; Taylor, 2011) as scaffolds for being well and learning well.

Abstract

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TRIGGERING?

fitness!  cognition?
TRIGGERING?

fitness
cognition
Brain-Derived Neurotrophic Factor (BDNF)

- brain protein
- miracle grow
- via aerobic exercise

- neurogenesis
- neuroplasticity
- neurotransmitters

BDNF MIRACLE GROW

(Ratey, 2008; Doidge, 2007)

0-hour
3 x 3 x 30 combo
(+) literacy
11 → 19,000 students
19 → 1 science
20 → 6 math
(-) violence

(Medina, 2008)
DEVELOPING

RESEARCH QUESTIONS
KNOWN → UNKNOWN

(Ratey, 2008; Doidge, 2007)

Naperville Illinois Public School Students On BDNF

0-hour
3 x 3 x 30 combo
(+ ) literacy
11 → 19,000 students
19 → 1 science
20 → 16 math
(-) violence

Adult Learners and Perspective Taking Experiences?

+ perception?
+ reflection?
+ analysis?
+ action?

Blank spaces in important places (Fullan, 2004)
WHAT, IF ANYTHING, IS THE RELATIONSHIP BETWEEN

1. EXERCISE
2. ACADEMIC EXCELLENCE
3. TRANSFORMATIVE LEARNING EXPERIENCES
PROPOSED STUDY: EXPERIMENTAL DESIGN

20 CONTROL PARTICIPANTS

RECORD USUAL AMOUNT OF EXERCISE

REPORT MIDTERM 4XXX COURSE GRADE

RESPOND TO LEARNING EXPERIENCES QUESTIONNAIRE

20 EXPERIMENTAL PARTICIPANTS

RECORD ADDITIONAL 3 TIMES/WEEK FOR 30 MN @ HR ZONE 3 EXERCISE

REPORT MIDTERM 4XXX COURSE GRADE

RESPOND TO LEARNING EXPERIENCES QUESTIONNAIRE

• 40 college seniors
• informed consent
• randomized groups
  • 6 weeks

• self reporting:
  1. exercise minutes/week
  2. 4XXX grade
  3. learning experiences
• by pseudonym
ACTUAL STUDY: EXPERIMENTAL DESIGN

10 CONTROL PARTICIPANTS

10 CONTROL PARTICIPANTS

RECORD USUAL AMOUNT OF EXERCISE

REPORT MIDTERM 4XXX COURSE GRADE

RESPOND TO LEARNING EXPERIENCES QUESTIONNAIRE

13 EXPERIMENTAL PARTICIPANTS

13 EXPERIMENTAL PARTICIPANTS

RECORD ADDITIONAL 3 TIMES/WEEK FOR 30 MN @ HR ZONE 3 EXERCISE

REPORT MIDTERM 4XXX COURSE GRADE

RESPOND TO LEARNING EXPERIENCES QUESTIONNAIRE

- 23 college seniors
- informed consent
- randomized groups
  - 6 weeks
- self reporting:
  1. exercise minutes/week
  2. 4XXX grade
  3. learning experiences
- by pseudonym
STUDY: specifics

PARTICIPANTS

RECORD EXERCISE

REPORT MIDTERM 4XXX COURSE GRADE

LEARNING EXPERIENCES QUESTIONNAIRE

RESEARCH DESIGN

JULES ON SCHOOLS

Learning Experiences Questionnaire Post-Test: Experimental Group

- An example of our early experience that brought me to question beliefs (please briefly describe below.)
LEQ (TLE via ENS)

LEARNING EXPERIENCES QUESTIONNAIRE

TLE

ENS
LEARNING EXPERIENCES QUESTIONNAIRE

LEQ (TLE via ENS)

1. Identifying trigger events
2. Reflective observation of meanings
3. Critiquing competing conclusions
4. Acting upon insights

(5. participant data)

• prefrontal brain regions
• temporal brain regions
• sensory brain regions
• motor brain regions
LEARNING EXPERIENCES QUESTIONNAIRE

LEQ (TLE via ENS)

Learning Experiences Questionnaire

1a. As a college student, I found myself questioning and rejecting some of my former views or attitudes, values, or beliefs
☐ I was
☐ I was not

2a. Upon reflection, I recognize that I responded to this experience in the above check all that apply:
☐ gained new perspective
☐ enhanced my knowledge
☐ improved my skills
☐ increased my confidence
☐ fostered personal growth
☐ strengthened my beliefs
☐ other (please describe below)

3a. As a result of this experience, I decided to analyze the merits of alternative attitudes, values, or beliefs:
☐ I was
☐ I was not

3b. My analysis led me to realize that certain attitudes, values, and beliefs I'd formerly held were inaccurate and in need of revision
☐ I was
☐ I was not

4a. Examples of any more informed actions include (please briefly describe below)

4b. In addition to more accurate attitudes, values, and beliefs, I began trying to translate these into more informed behaviors or actions:
☐ I was
☐ I was not

5a. As a college student, I generally tended to involve myself with people and activities that
☐ challenged my existing views
☐ affirmed my existing views
☐ avoided such examination of views
☐ other (please describe below)

5b. My academic major is/ was

5c. My academic minor is/ was

5d. I participated in the Exercise Academic Excellence study's
☐ control group
☐ experimental group

5e. I'm submitting these responses
☐ before participating in the study
☐ after participating in the study

5f. My study pseudonym is

5g. May the researcher contact you to discuss the information you've shared?
☐ Yes
☐ No

Thanks for your responses. Please return this survey to your survey administrator.
LEQ

PRELIMINARY FINDINGS (50% COMPLETE)

COLOR KEY:
BRAIN REGION
TRANS ED THEORY

SYMBOL KEY:
C: CONTROL
E: EXPERIMENTAL
EMERGING QUESTIONS

1. Sensory/Trigger
   C:E

2. Temporal/Reflective
   C:E

3. Frontal/Analytical
   C:E

4. Motor/Action
   C:E
Based on 50% LEQs

ITEM 1.
PRELIMINARY FINDINGS

Based on 11/23 LEQs

- Motor/Action: C=E!
- Sensory/Trigger: C=E
- Temporal/Reflective: C:E!
- Frontal/Analytical: C:E!

Based on 50% LEQs

ITEM 2.

2a. Upon reflection, I recognize that I responded to this experience by (please check all that apply)

- Fighting it: 1 (17%)
- Taking flight from it: 1 (17%)
- Enduring it: 1 (17%)
- Engaging it: 3 (50%)
- Other: 1 (17%)

People may select more than one checkbox, so percentages may add up to more than 100%.

2a. Upon reflection, I recognize that I responded to this experience by (please check all that apply)

- Fighting it: 1 (20%)
- Taking flight from it: 1 (20%)
- Enduring it: 4 (80%)
- Engaging it: 3 (60%)
- Other: 0 (0%)

People may select more than one checkbox, so percentages may add up to more than 100%.
ITEM 3. Based on 50% LEQs

3a. As a result of this experience, I decided to analyze the merits of alternative attitudes, values, or beliefs

- yes (please continue to the next question) 5 83%
- no (please proceed to question 5a) 1 17%

People may select more than one checkbox, so percentages may add up to more than 100%.

3b. My analysis led me to realize that certain attitudes, values, and beliefs I'd formerly had were inaccurate and in need of revision

- yes (please continue to the next question) 3 50%
- no (please proceed to question 5a) 3 50%

People may select more than one checkbox, so percentages may add up to more than 100%.

3c. In order to construct more accurate attitudes, values, or beliefs, I dialogued with (please check all that apply)

- my own reflective self 5 83%
- more experienced others 2 33%
- similarly experienced others 3 50%
- less experienced others 2 33%
- Other 1 17%

People may select more than one checkbox, so percentages may add up to more than 100%.
Based on 11/23 LEQs:

- Motor/Action: C = E!
- Sensory/Trigger: C = E
- Temporal/Reflective: C : E!
- Frontal/Analytical: C : E!

Based on 50% LEQs:

- Motor/Action: 3 (50%)
- Sensory/Trigger: 3 (50%)
- Temporal/Reflective: 3 (50%)
- Frontal/Analytical: 2 (33%)
1. Sensory/Trigger
C:E !

2. Temporal/Reflective
C:E !

3. Frontal/Analytical
C:E !

4. Motor/Action
C:E !

COLOR KEY:
BRAIN REGION
TRANS ED THEORY

SYMBOL KEY:
C: CONTROL
E: EXPERIMENTAL
! EMERGING PATTERNS

PRELIMINARY
PRELIMINARY
PRELIMINARY
PRELIMINARY
FINDINGS
(50%
COMPLETE)
DISCUSSION PLEASE

CONTENT PROCESS IMPLICATIONS CONFERENCE THEMES

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