Accelerating Motor Learning and Sustaining Outcomes through Support for Fundamental Psychological Needs

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Objectives

Participants will …

1. be able to summarize research regarding the roles of competence (expectations/self-efficacy), autonomy, and social relatedness in motor learning.
2. be able to identify at least two challenges in the integration of the research evidence into professional education and/or clinical practice.
3. consider a definition of professional expertise that includes skill in supporting patients’ fundamental psychological needs.

Fundamental psychological needs: A framework for understanding motivation in clinical practice

Motivational “Umbrella”

Stable/Enduring

Malleable

Traits [Dispositions]

States

Personality

Situations
MOTIVATIONAL IMPACTS

Motor Learning

Short-term

Long-term

Choices, approach/avoid

Persistence

Effort

Quality and Quantity of Motor Performance

Adherence to Recommended Actions

MOTIVATION

Fundamental Psychological Needs

Autonomy

Competence

Social Relatedness

Rewards

“Reinforcement”

Appetitive Drives

Hedonic (Addictions)

Intrinsic and Extrinsic

External Incentives

Fundamental Psychological Needs

- **Competence**: Need to perceive oneself as capable or competent.
- **Autonomy**: Need to determine or feel in control of one’s own actions.
- **Social Relatedness**: Need to feel included, accepted, or connected to others, to feel satisfaction in one’s involvement with the social world.
Social Environment/Context
Can promote/support or thwart basic psychological needs

BUILDING COMPETENCE/EXPECTATIONS FOR MOTOR LEARNING AND PERFORMANCE

SUPPORT
(Not supply)

THWART

Fundamental Psychological Needs

*Competence*: Need to perceive oneself as capable or competent.

[Competence]
Beliefs and expectations about one's capabilities; self-efficacy

**PARTICIPANTS**
Older adults attending a university physical activity program

**GROUPS**
Enhanced expectancy
"Active people like you, with your experience, usually do very well on this task."
Control

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Wulf, Chiviacowsky, Lewthwaite (2012)

**Groups**
Enhanced expectancy
"Active people like you, with your experience, usually do very well on this task."
Control

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* Large 10-piece jigsaw puzzles (requiring eye-hand coordination, manual dexterity, use of strategy)
* Residents of intermediate-care nursing home randomized to one of 3 groups:
  "Helping", "Encouragement Only" or No Contact
* 4 x 20-minute sessions:
  "Helping": encouraged work on puzzle, actively assisted in locating puzzle pieces, suggested where to put them, and often solved the puzzle "with" the resident.
Avorn & Langer (1982). Induced disability

Dobkin BH et al. (SIRROWS). International randomized clinical trial, [SIRROWS], improves outcomes. NNR, 2010.

- RCT in inpatient stroke rehabilitation
- 179 participants randomized, with stratified assignment into one of 2 groups
- Had to be able to follow simple instructions for feedback about walking speed and take 5 steps with <= max assist of 1 person
- Primary outcome measure: self-selected fast safe walking speed (m/s) at discharge, over 50-ft walkway (by blinded evaluator)

Dobkin et al., (2010)

All participants:
- received site’s conventional IP rehabilitation
- performed a daily 10-m walk

GROUPS:
- Daily Reinforcement of Walking Speed (DRS):
  - Fast, safe, walk was timed, feedback and encouragement given:
  - e.g., “Very good! You walked that in (# of) seconds.”
  - Then, (a) “This is better by x seconds,” or (b) “... holding your own,” or (c) “I believe you will soon be able to walk a bit faster.”

- No Reinforcement of Walking Speed (NRS):
  - No timing of walks nor feedback

RESULTS

Walk time + encouragement > None
Walking speed at discharge (.91 v .72 m/s, p = .01) [21% difference between groups equal at admission]

Walking speed > at 3 months post-discharge
(p = .03)

- All participants received veridical (true) personal performance feedback (their own error scores, average deviation from the horizontal platform target over a 90-second trial)
- Random assignment to one of 3 groups
- 2 practice days of 7 trials each
- A retention test of learning (no feedback) on third day

Conceptions of ability

- **Inherent Ability Group:**
  "The balance platform measures people's basic natural capacity for balance... The scores you will be given after each trial, as well as how easy it is to improve, will reflect your inherent balance ability."

- **Acquirable Skill Group:**
  "...balance is a learnable skill. At the beginning, it is common to have relatively large platform excursions... The scores you will be given after each trial, as well as your improvement across trials, will reflect your learning and your 'getting the hang of it.'"

- **Control Group:**
  No additional statement

Mean power frequency (MPF) of platform adjustments during practice and retention phases. **Acquirable skill:** more frequent, lower amplitude, adjustments of the platform (i.e., more automatic, reflex-type, movement control).
Autonomy support and outcomes

Fundamental Psychological Needs

* **Autonomy:** Need to determine or feel in control of one’s own actions

Subtle conditions that convey freedom of engagement or personal autonomy matter

* Small choices can have large impacts
* Mere choice, incidental choices, can affect learning
* Social interactions and controlling language can threaten autonomy (“I want you to …”)
Self-controlled practice conditions vs. yoked conditions


- 28 individuals with PD (H & Y II and III) into 2 groups
  - Self-controlled or Yoked use of balance poles
  - Primary task was the stabilometer (time in balance)

Self-controlled and Yoked use of balance poles

Chiviacowsky, Wulf, Lewthwaite, and Campos (2012)
“The Renoir Effect”
(Lewthwaite, Chiviacowsky, & Wulf, in prep)

* Primary task was the stabilometer (time in balance)

* Undergraduate Kinesiology students randomized to one of 2 groups:
  
  Choices or No Choices

**Choices Group:** Presented with two choices unrelated to the primary stabilometer task:

1. 2nd task preference: a coincident-timing task (Bassin timer) or a force-control (hand dynamometry) task?

2. Which of two prints of paintings by Renoir they thought the investigator should hang on the laboratory wall.

**No-Choices Group:** Yoked; told of 2nd task and Renoir print

- 82 undergraduates
- Random assignment to one of 3 groups:
  - Controlling, neutral, or autonomy supportive “teacher”
- Puzzle solving task (time too short to solve)
- Salivary cortisol samples:
  - Baseline rest,
  - immediately after task/manipulation,
  - 20 minutes later

• Neglect of the learner’s perspective
• Intrusion
• Pressure
• “Controlling language”
  - must
  - should
  - have to
  - “I want you to ...”
  - “you are accountable for”
  - etc.

Reeve & Tseng (2011)
Baseline-adjusted changes in cortisol

Autonomy
- Small choices, including those unrelated to the motor task, can affect motor learning.
- Self-controlled practice conditions can operate without providing content or strategic learning advantages.
- Thinking “too big” (incompetence) or “too trivially” (disrespect) in choice offered can be problematic.
Autonomy support and social relatedness:

Video examples

Social relatedness in learning and clinical outcomes

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Learning to balance on a stabilometer

<table>
<thead>
<tr>
<th>Practiced Individually</th>
<th>Practiced with a Partner (dyad-alternate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Participant 1</td>
<td>1. Participant 1</td>
</tr>
<tr>
<td>2. Participant 1</td>
<td>2. Observed partner</td>
</tr>
<tr>
<td>3. Participant 1</td>
<td>3. Dialogued</td>
</tr>
<tr>
<td>4. Participant 1</td>
<td>4. Participant 1</td>
</tr>
<tr>
<td>5. Participant 1</td>
<td>5. Observed partner</td>
</tr>
<tr>
<td>6. Participant 1</td>
<td>6. Dialogued</td>
</tr>
<tr>
<td>7. Participant 1</td>
<td>7. Participant 1</td>
</tr>
<tr>
<td>8. Participant 1</td>
<td>8. Observed partner</td>
</tr>
</tbody>
</table>

... continued to 8 trials for P1 [P2]
Accelerating Motor Learning and Sustaining Outcomes
Lewthwaite, Blanton, Wolf, Wishart, & Winstein

RMSE (deg)

Shea, Wulf & Whitacre (1999)

Practice (Day 1)
Retention (Day 2)

Dyad
Individual

Fundamental Psychological-Biological Needs

Autonomy

Competence

Social Relatedness

 Competence enhancement, collaboration, celebration, positive affect: better motor learning

“We already do that.”
“ But, it’s so cool!”
“All the children are above average.”
Discussion
What are the research, practice, and educational implications of this evidence?

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Audience Participation
Question and Answers, Comments

Conclusions
• Motivation affects motor learning, along with many other behavioral, physiological, and experiential outcomes.

• Need to approach development of professional insights and skills in this area with more urgency.

• It’s not easy, in part because we all need to feel competent, in control, and respected.

Conclusions
• (Continue to) Redefine what constitutes key professional attributes:

The great therapist is one who (among other attributes) insightfully and skillfully engages patients’ intrinsic motivational resources to potentiate recovery.
Accelerating Motor Learning and Sustaining Outcomes

Lewthwaite, Blanton, Wolf, Wishart, & Winston

Featured Articles


Additional Readings:


Bandura A. Health promotion by social cognitive means. Health Educ Behav. 2004; 31: 140-144.


Lewthwaite, Blanton, Wolf, Wishart, & Winsten  

Accelerating Motor Learning and Sustaining Outcomes


