# Resident Success Factors for Competency Gain and American Board of Otolaryngology in-Service Examination

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## Abstract

**Objectives:** Identify significant predictors for each of two resident outcomes,
(1) the overall competency gain over a year in a residency program
(2) American Board of Otolaryngology (ABO):
Otolaryngology Training / In-Service Examination (OTE) score.

**Study Design:** A longitudinal cohort study.

**Methods:** Examined multi-dimensional factor associations in
(a) resident's likely habitual personalized approaches in learning,
(b) residency burnout, and (c) the two evaluation outcomes.

**Results:** Three factor models in (a) & (b) dimensions, accounted for the competency gain in critical thinking (83%) and knowledge (48%). The domain associations with OTE $r = 0.7$ and $r = 0.6$, respectively.

**Conclusions:** To promote surgical residents' gain of the overall competencies, especially in critical thinking, the data suggest understanding how individuals take learning actions and react about residency burnout.

## Introduction

A current demand for innovations: Teaching hospitals and medical centers should optimize the role of graduate medical education (GME) for improving health care safety and quality (ACGME, 2012: Pursuing Excellence in Clinical Learning Environments initiative, Clinical Learning Environment Review Program) [1]

Suggested strategic models for educational environment: **Outcomes** driven; **Pathways**-to-Excellence for promoting progressive capacity development of learners, leaders, and innovators; Formative assessments and **feedback**

Bandura's Reciprocal Determinism[2]: Importance to understand inter-related factors in person's behavior, environment, and personal dimensions.

Do residents' *learner autonomy* and *residency burnout* affect to the *outcomes* of learning actions?
(1) Gained competency in Otolaryngology - Head and Neck Surgery (OHNS)
(2) Otolaryngology Training / In-Service Examination (OTE) score.

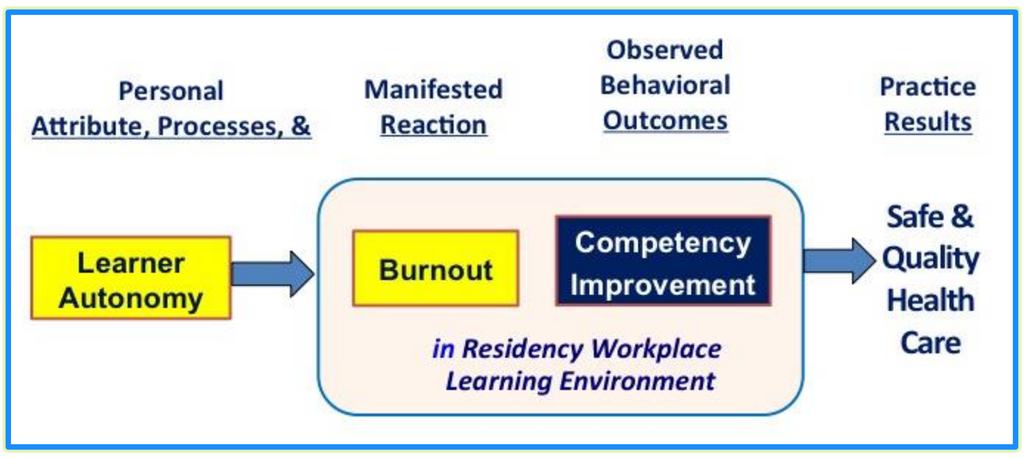


**Figure 1.** Conceptual Framework

## Methods and Materials

- In fall 2013, OHNS residents in a program self-assessed two questionnaires:
  (a) Learner Autonomy Profile-Short Form (LAP-SF) [3]
    - Desire, Resourcefulness, Initiative, Persistence
  (b) Maslach Burnout Inventory-Human Services (MBI-HS) [4]
    - Emotional Exhaustion, Depersonalization, Lack of Personal Accomplishment
- Fall 2013 - 2015, (1) cumulative gain scores of competencies (Fund of Knowledge; Critical Thinking; Technical Skills, Interpersonal Skills) rated by the program faculty using a structured form [5], and (2) ABO OTE score
- Analyzed correlations (performed for 1000 bootstrap samples), and regression models (highlighted univariate analysis of variance).

## Results

- Internal Consistency (Cronbach's Alpha): LAP-SF 0.98, MBI-HS, 0.83, and Faculty rating > 0.72.
- Tale 2: **Higher gain of competency** by end of the year residency, accounted for Critical thinking (74%, adjusted $R^2$); Overall competency (62%, adjusted $R^2$), by three factor models (**Higher Personal Accomplishment** feeling reduced burnout; **Lower Initiatives** in Learning; **Higher Persistence** in Learning).
- Table 3: **OTE achievement score** (65%, adjusted $R^2$), accounted by two-factor model (**not-single**; **higher learner autonomy skill on resolving conflicts**).

**Table 1.** Study Participants ($N$=16) * * Average Age 31 years old

| Characteristics | | *N* (%) |
|---|---|---|
| PGY | 1-3 | 8 (50%) |
| | 4-7 | 8 (50%) |
| Gender | Male | 10 (62%) |
| | Female | 6 (37%) |
| Domestic Status | Not-single | 9 (56%) |
| | Single | 7 (44%) |

**Table 2.** Three Predictors **of Critical Thinking Competency Improvement** (1000 Bootstrap samples)

| Parameter | B | Bias | Standard Error | *p* | 95% CI | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Burnout (lack of Personal Accomplishment) | - .63 | .02 | .11 | <.01 | -.79 | -.33 |
| Learning Persistence | .06 | < -.01 | .02 | .01 | .01 | .09 |
| Learning Initiative | - .03 | < -.01 | .01 | .04 | -.06 | .00 |

**Table 2.** Two Predictors of **OTE Correct Percent Score** (1000 Bootstrap samples)

| Parameter | B | Bias | Standard Error | *p* | 95% CI | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Not-Single | 6.65 | -.23 | 2.75 | <.01 | .81 | 11.43 |
| Learner Autonomy: Resolving Conflicts | .53 | -.03 | .21 | .04 | .02 | .87 |

## Discussions

- Developing residents' personal skills for ongoing learning and improvement may be an important strategy to promote the gain of overall competency outcomes, especially to improve surgeons' critical thinking capacity; Assessments and feedback on those skills are recommended.
- Limitation: a small sample study in a single program
- Further study suggestions: Multi-site collaborative to verify the results

## Conclusions

The data suggest that
- understanding how residents conduct learning and residency burnout experiences is important, in order to promote the overall gain of competencies in knowledge and critical thinking.
- practicing competency outcome-based education should include the assessment of personal dimension factors, such as learner autonomy and burnout; it may guide data-driven feedback strategies.
- Examining learner success factors for building strategic pathway models.

## Contact

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## References

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