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Ethics underpin Behavioural Science at NRC Construction

Jennifer A. Veitch, Ph.D.

2017-11-03, Ottawa - Symposium on Ethics & Human-centric Science at NRC



What we do...

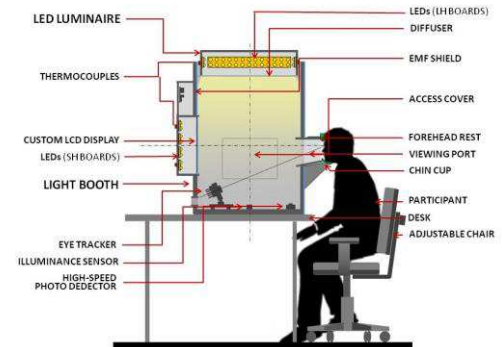
- Integrated disciplines: physics (building physics, acoustics), engineering (mechanical, civil, environmental, energy), architecture, psychology, human factors
- Behavioural science features in **Intelligent Building Operations, Building Envelope & Materials**, and **Fire Research** directorates
- Staff contribute to several R&D programs & many clients:
 - High Performance Buildings
 - Building Regulations for Market Access
 - Working & Travelling on Aircraft
 - Arctic

Ethics framework

- [Canadian Code of Ethics for Psychologists \(4th ed, 2017\)](#)
 - Principle I: Respect for the dignity of persons and peoples
 - Includes: informed consent, freedom of consent, protection for vulnerable individuals & groups, privacy, confidentiality
 - Principle II: Responsible Caring
 - Includes: competence; risk/benefit analysis; maximize benefits, minimize harm; offset or correct harm
 - Principle III: Integrity in Relationships
 - Includes: accuracy/honesty; objectivity; avoidance of incomplete disclosure and deception; avoidance of COI
 - Principle IV: Responsibility to Society
 - Includes: development of knowledge; beneficial activities; respect for society

Laboratory Experiments

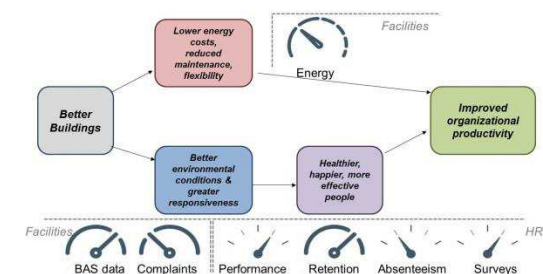
- Perception/cognition
 - Sound transmission
 - Lighting system
- Office simulations – effects on performance, satisfaction, comfort, mood
 - Lighting systems
 - Ventilation systems
 - Controls
 - Acoustic treatments



- **Ethical considerations:** scientific validity; sample size; risk/benefit, recruitment; informed consent; confidentiality; privacy
- Generic protocol, expedited review

Field Investigations: Offices

- Relate interior conditions to occupant experiences: satisfaction, well-being, performance, comfort...
 - Post-occupancy assessment: online surveys, in-person measurements
 - Analyze archival data: employee surveys, BAS data
 - Interventions: retrofit new building technologies, study consequences
- **Ethical considerations:** scientific validity; organizational access, informed consent, anonymity protections, transparent communications, IT security, risk/benefit



Field Investigations: Homes

- Interventions:
 - Modify HVAC → health effects?
 - Smart home technologies for demand-response utility programs
- Measurements:
 - Radon assessments
 - HRV/ERV performance in Arctic homes
- Naturalistic investigations
 - Investigation tacked on to others' interventions



- **Ethical considerations:** Scientific validity; free & informed consent; transparent communications; cost/benefit; minimize harm (ongoing support); privacy; confidentiality; Internet security
- **Other considerations:** Partner buy-in to ethics considerations; multiple REBs

Surveys

- Anonymous public surveys, by mail, online, or in-person
 - Knowledge of IAQ issues in homes; comfort during air travel
- ***Ethical considerations:*** Scientific validity; anonymity; free & informed consent; potential harms vs benefits; data quality & security
- ***Other considerations:*** TBS Public Opinion Research

Data Analytics

- Smart meter data, smart home technologies (e.g. security system) → potential energy savings
- Occupancy monitoring for building energy management
 - Cell phone signals; badge-swipes; keystroke monitors...
- ***Ethical considerations***: anonymity; informed consent (?); potential harms



Conclusions

- Research ethics considerations fall within our core values
- Process leads to stronger research
- *When in doubt, consult!* REB is approachable

- For all researchers there are also publication ethics... a topic for another day

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