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# Virtual Environments, Decision-Making, and Fear of Crime

Examining the Interaction between  
Cognition and Criminology in  
Vancouver's Down-Town East Side

Andrew Park, Joe Clare, Valerie Spicer, Patricia Brantingham, Tom Calvert, & Greg Jensen

# Overview

- What is fear of crime?
- Individual differences and fear of crime
- Environmental factors and fear of crime
- Virtual environments
- Methodology
- Results
- Limitations
- Future directions

# Fear of crime

- Emotional state
- Interaction between
  - Cognition
  - Values
  - Tolerance for crime
- Can be measured by behavioral decisions to prevent possible victimization

# Who is afraid of crime?

- Age, sex and victimization impact on fear

Sex	Age	Victimisation rate*	Unsafe day (%)		All
			Victims	Non victims	
Male	Under 25	16.5	5.4	2.0	2.5
	25 and over	9.6	9.3	2.2	3.3
	All males	10.8	8.3	2.6	3.2
Female	Under 25	15.6	8.2	2.8	3.6
	25 and over	8.7	13.8	4.1	4.9
	All females	9.9	12.3	3.9	4.7
<b>All respondents</b>		10.3	10.2	3.3	4.0

\* 12-months, any crime, 2005 National Crime & Safety Survey, ABS

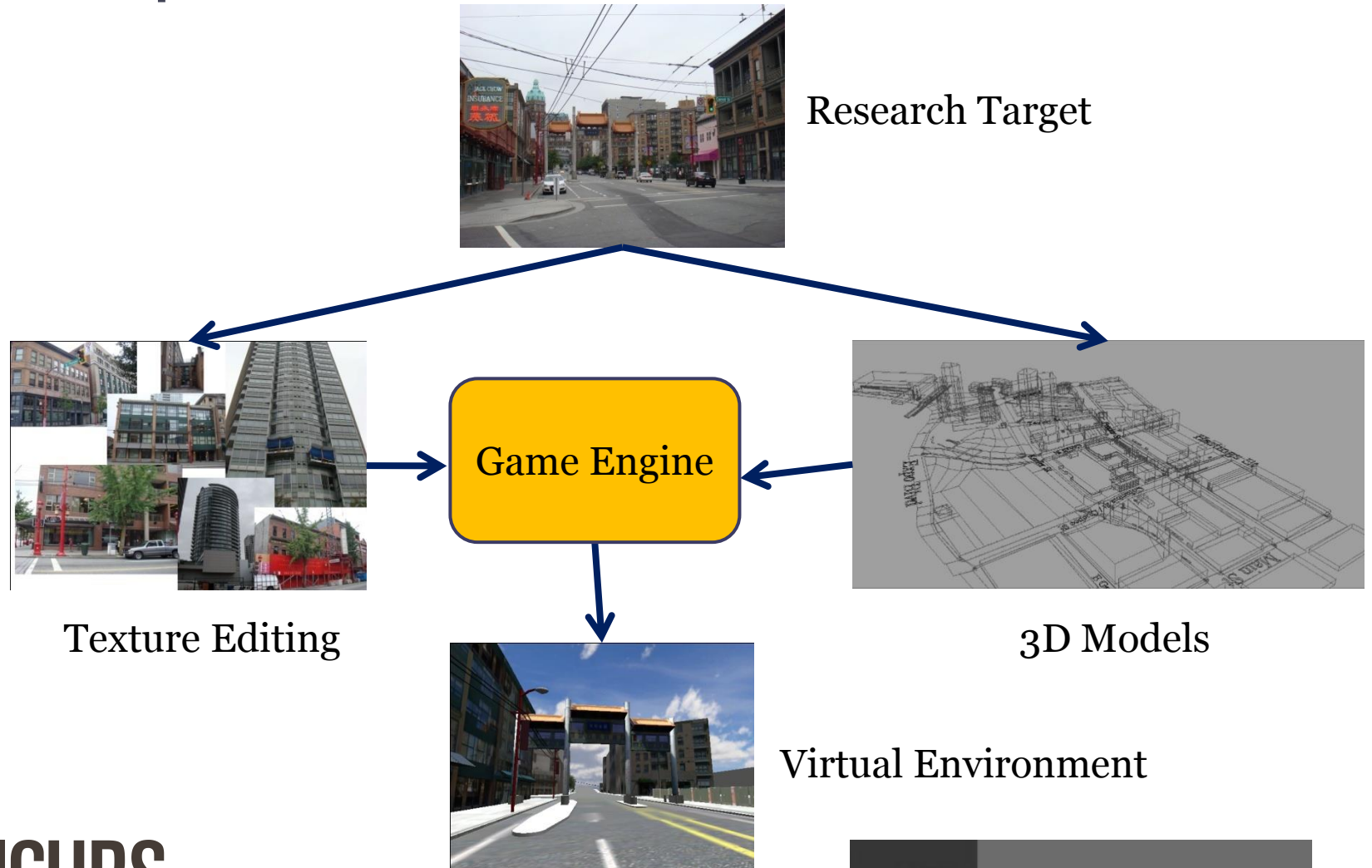
# Environmental causes of fear

- Environmental cues that cause fear
  - Social incivility: visible drug dealing, prostitution, public drunkenness, violence & threatening people
  - Physical incivility: vandalism, graffiti, urban decay
- Physical layout effects and escape
  - Lurk lines: zones beyond visibility – hiding places
  - Alley width: lack of choice
  - Insufficient lighting

# Virtual environments and criminology

- Fear of crime at railway stations (Cozens, 2003)
- Fear of crime and street lighting (Inoue, 2005)
- Physical environments and spatial knowledge (Cubukcu and Nasar, 2005)

# Development of virtual environments

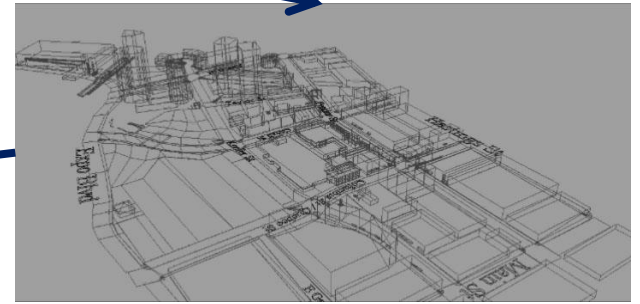


Research Target



Texture Editing

Game Engine



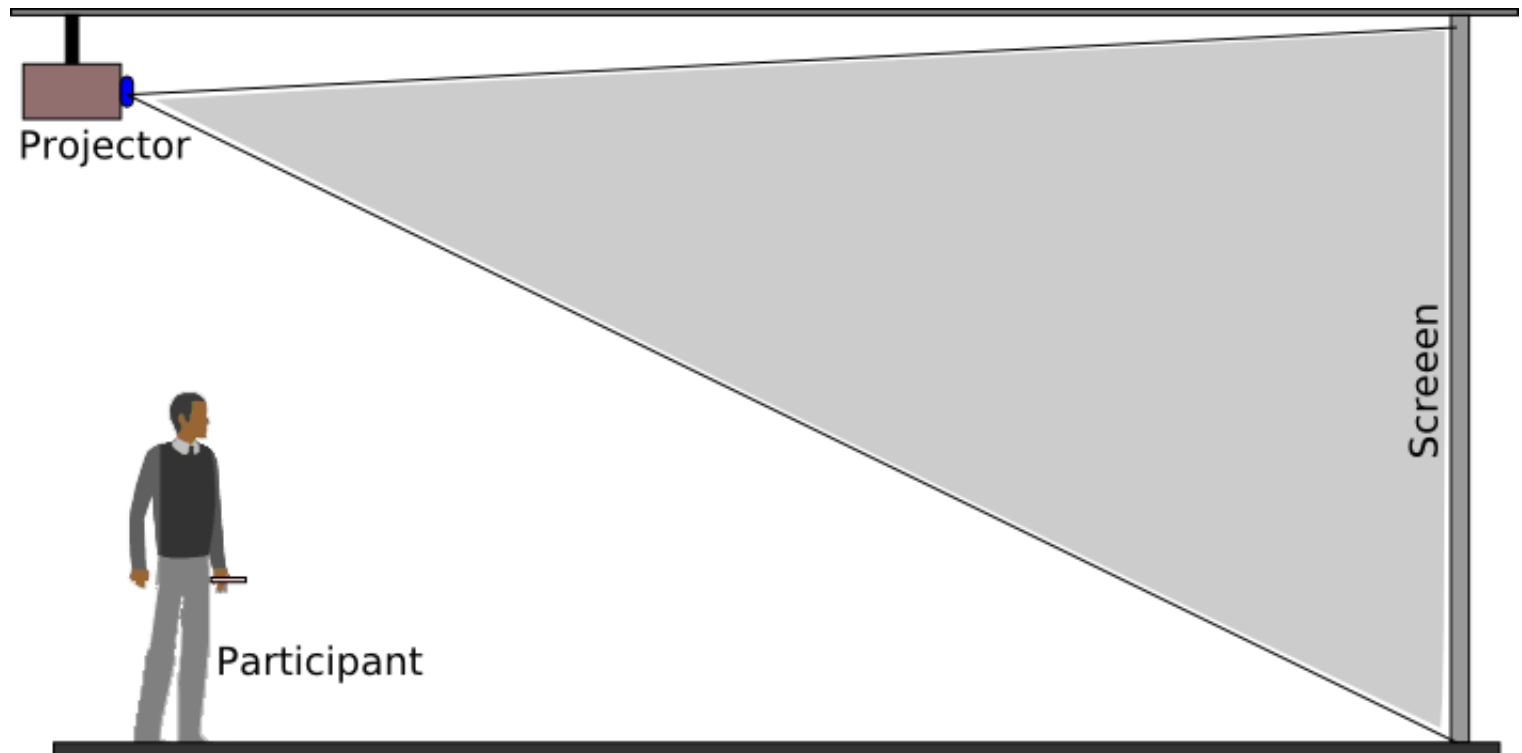
3D Models



Virtual Environment



# Experimental setting



# Bringing them together: methodology

- 5 decisions points on a journey from Gas Town to China Town

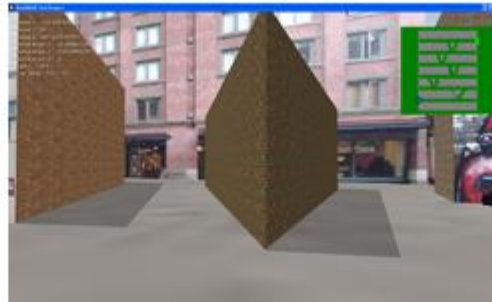


Decision Point #1

- Narrow alley vs. wider alley
- Lack of choice
- Signs of physical incivility (graffiti) in both directions
- AVERSION decision - right

# Bringing them together: methodology

- 5 decisions points on a journey from Gas Town to China Town



Decison Point #2

- Lurk lines
- Zone beyond visibility
- Hiding places
- Limited knowledge of what is around
- AVERSION decision - left

# Bringing them together: methodology

- 5 decisions points on a journey from Gas Town to China Town
  - Lurk lines
  - Zone beyond visibility
  - Hiding places
  - Limited knowledge of what is around
- AVERSION decision - right



Decision Point #3

# Bringing them together: methodology

- 5 decisions points on a journey from Gas Town to China Town



Decision Point #4

- Presence of threatening person
- Intoxicated person
- Social incivility
- AVERSION decision - left

# Bringing them together: methodology

- 5 decisions points on a journey from Gas Town to China Town
- Presence of single person (left) vs. multiple people (right)
- Group of people
- Possible social incivility
- AVERSION decision - left



Decision Point #5

# Bringing them together: methodology

- 5 decision points on a journey from Gas Town to China Town



Decision Point #1



Decision Point #2



Decision Point #3



Decision Point #4



Decision Point #5

# Hypotheses

- Individual differences in aversion decisions
  - AGE: Females > males
  - SEX: Older > younger
  - VICTIMIZATION: Previous victims > non-victims
- Dependent variables
  - Aversion Decisions
    - range: 0 – 5
    - Higher value equates to more Aversion Decisions
  - Time (to navigate the entire environment)



# What we found - 1

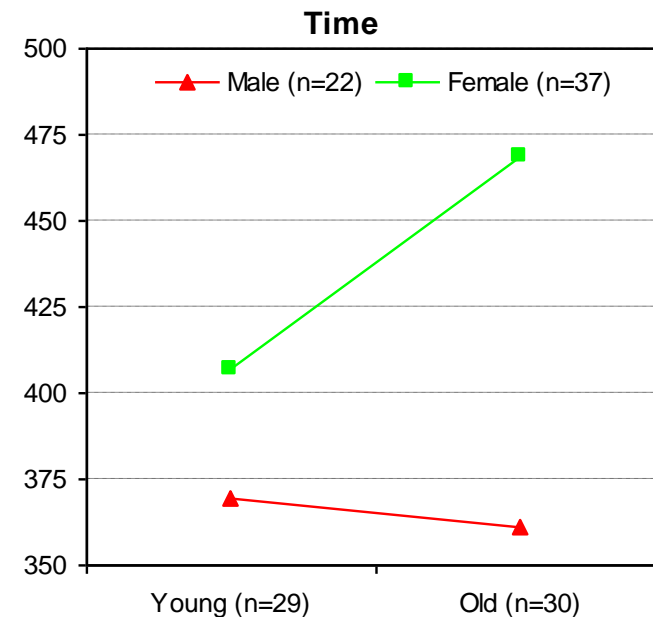
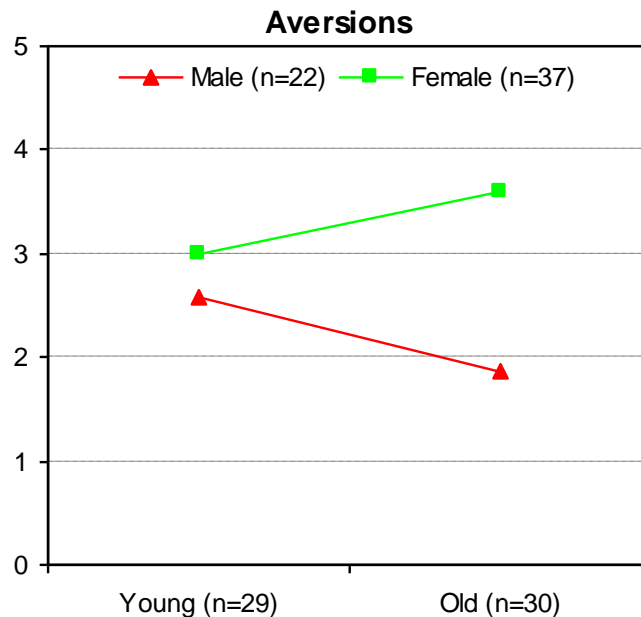
- Concerns about using VICTIMIZATION as an IV

<b>Sex</b>	<b>Age</b>	<b>Victimisation rate*</b>	<b>NCSS 2005 comparison*</b>
Male	Under 30	35.7	16.5
	30 and over	50.0	9.6
	All males	40.9	10.8
Female	Under 30	20.0	15.6
	30 and over	38.1	8.7
	All females	30.6	9.9
<b>All respondents</b>		<b>34.5</b>	<b>10.3</b>

\* Age groups for the NCSS 2005 data was split at 25 years, not 30 years as with out data

# What we found - 2

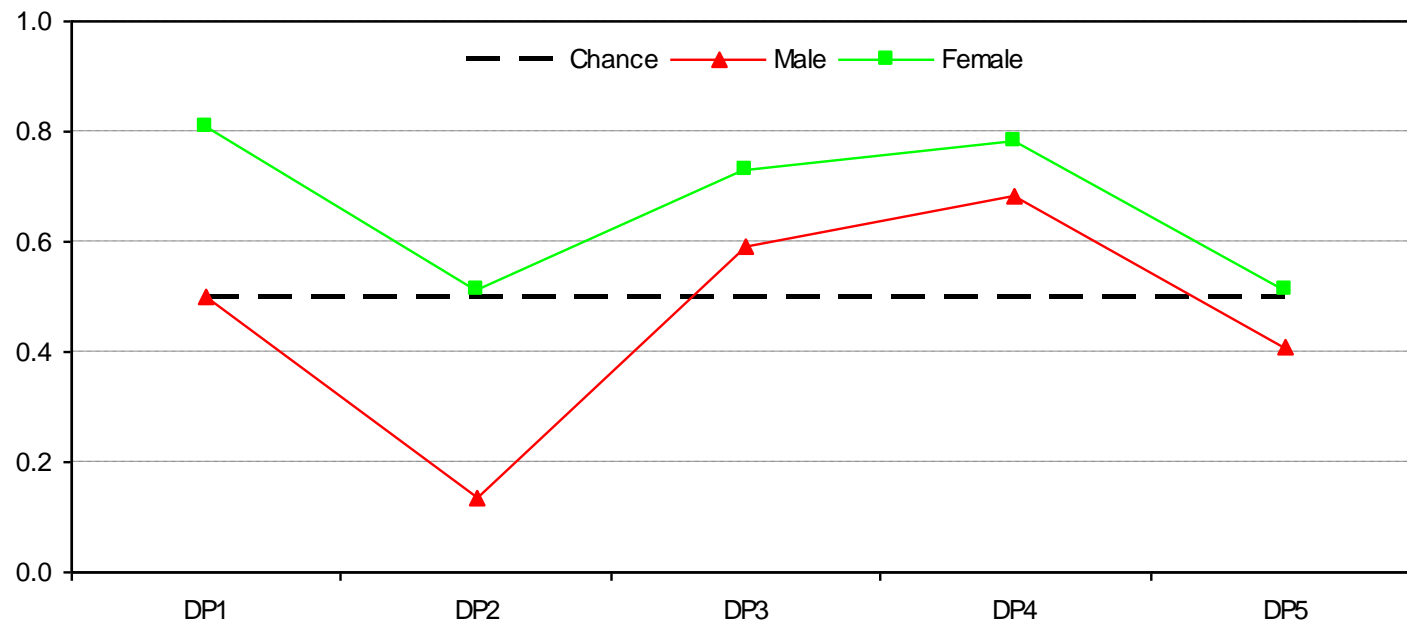
- Overall effect of SEX, but not AGE (and no interaction)



Correlation between AVERSIONS and TIME = 0.52

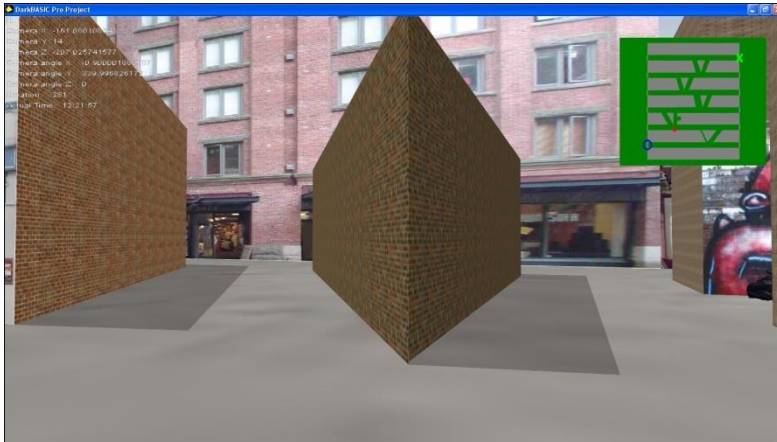
# What we found - 3

- Not all decision points performed the same



# What we found - 3

- Decision Point 2



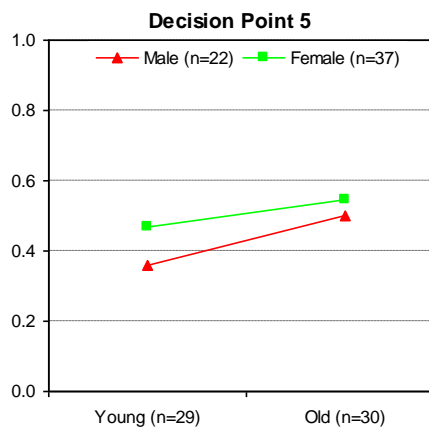
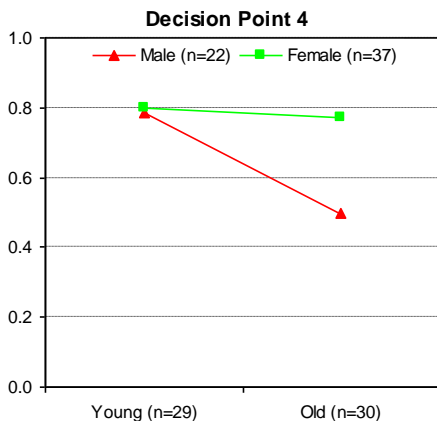
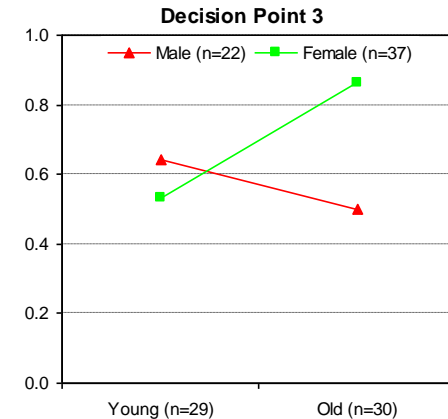
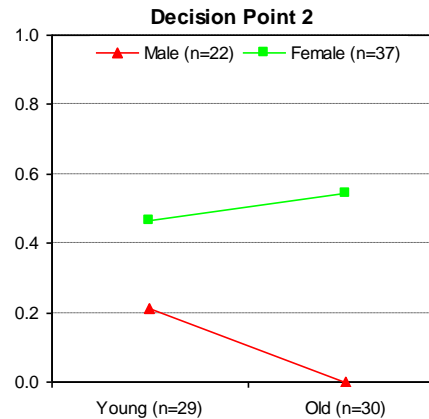
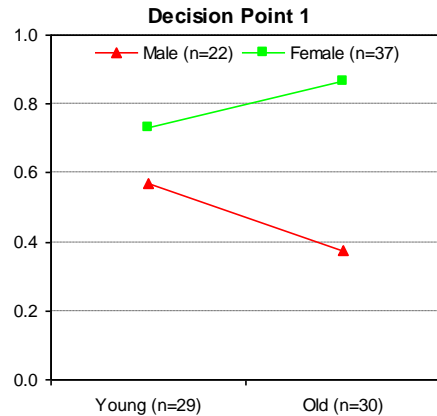
- Decision Point 5



- Hidden spaces: a paradoxical role (fear vs. curiosity) (Herzog & Flynn-Smith, 2001).
- Single person vs. multiple people: different judgment (number of people, appearance, posture, etc.)

# What we found - 4

- Unusual sample of older males (n=8)



Curiosity and pragmatism appear to explain this group to some extent

# Did it work?

- With respect to hypotheses
  - Effect of SEX
  - No clear effect of AGE
  - VICTIMIZATION not tested
- Not exactly as would have been predicted based purely on other methods of assessing individual differences and environmental cues
- Positive signs though and a solid start

# Limitations

- Victimization question arguably too broad
- Unequal numbers within cells of design (particularly older males)
- Need to control for the relationship between actual distance and perceived risk
- Limited background noise and limited other people in the virtual environment

# Future directions

- Systematically control analysis of environmental factors supposed to induce fear
  - Graffiti vs. people
  - Physical incivility vs. social incivility
- Extend virtual environments to
  - Offender decision making
  - Selecting crime prevention strategies
  - Cross-cultural (experience) effects