

COGNITION IN ACTION

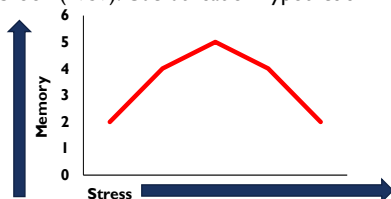
LECTURE SIX: DECISION MAKING IN THE REAL WORLD

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EFFECTS OF VIOLENCE AND WEAPON FOCUS ON DECISION MAKING

- Stress, high emotion, and violence of event are thought to be detrimental to an EWs memory and decision making.
- Easterbrook (1959): Cue-utilisation hypothesis



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EFFECTS OF VIOLENCE AND WEAPON FOCUS ON DECISION MAKING

- Weapon Focus: when attention is directed towards a weapon (due to threatening nature), less attention is allocated to other stimuli.
 - E.g., suspects face, clothing, voice, etc.
- Weapon becomes central component of event and impacts how the EW encodes other info.
- Memories are formed from where attention is allocated.
- Using techniques to try to retrieve memory to make a decision will not work if "other" information was not encoded to begin.



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EFFECTS OF VIOLENCE AND WEAPON FOCUS ON DECISION MAKING

- However: is the EWs inability to make a decision based upon the lack of information having been encoded to memory due to the weapon focus effect?
- Loftus (1980): it is not the weapon that leads to the effect, instead it is the high emotion/stress the person experiences during encoding.
- Christianson (1992): Difference between central and peripheral details of event:
 - Central details: memory for negative emotional events better than neutral
 - Peripheral details: memory for negative emotional events poorer than neutral.

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EFFECTS OF VIOLENCE AND WEAPON FOCUS ON DECISION MAKING

- Loftus, Loftus, and Messo (1987): Attention, eye fixation, and memories are connected.
 - Participants were shown a man in a bank either holding a cheque or a weapon
 - Significantly less participants could ID him when he was holding a gun compared to when he was holding a cheque.
 - Furthermore, eye fixation time was significantly longer focused on the weapon than on the cheque.
- However: can poor decisions when ID'ing suspects by EWs purely be explained through the emotional arousal of weapon focus causing a lack of encoding???.....

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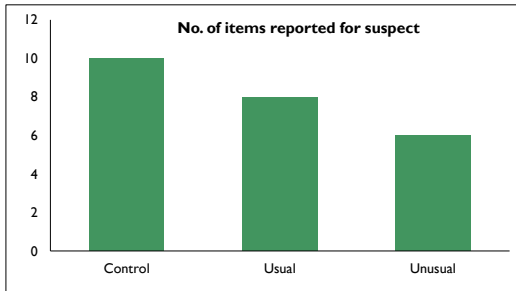
THE ROLE OF UNUSUALNESS IN MEMORY AND DECISION MAKING

- Pickel (1998): The chicken in the hairdressers study.
 - Manipulated threat level and unusualness within an event:
 - Participants watched a video of a man entering a hair salon, who then approached the receptionist holding one of the following:
 1. Scissors (high threat, low unusualness)
 2. Gun (high threat, high unusualness)
 3. Wallet (low threat, low unusualness)
 4. Raw chicken (low threat, high unusualness)
- (or he was carrying nothing in a control condition)



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THE ROLE OF UNUSUALNESS IN MEMORY AND DECISION MAKING



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WEAPON FOCUS IN REAL CASES

- For real EW, it is not as simple as the lab work implies
- Tollestrup, Turtle, and Yuille (1994): examined archival analysis of victims and EWs to robbery:
 - Expected better memory from witnesses compared to victims – but no difference found.
 - Weapon present did not decrease number or accuracy of details
 - Weapon present did decrease accuracy of suspect ID.
- Christianson and Hubinette (1993): 110 real victims and EWs to robbery:
 - Victims remembered more than bystanders (accurate, detailed, and long-lasting).
- Yuille and Cutshall (1986): Only way to study effect of stress is through real cases – lab work cannot simulate threatening situation.
 - Lab and field work lead to formation of qualitatively different memories.

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WEAPON FOCUS IN REAL CASES

- Christianson (1992): but stress cannot be measured objectively in the field – there is no neutral comparison.
- So, does violence impact EW memory?
 - Different outcomes from lab and field studies
 - Lab work suggests there is memory impairment but little ID effect
 - Field work is very mixed
 - Some find detriment to memory
 - Some find enhancement of memory
 - Some find no difference
- In sum: there are a number of different aspects that can impact an EW's memory for an event and later decisions regarding it.

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WHAT ABOUT JURY'S DECISIONS?

- Trial by jury of peers thought as cornerstone of a fair legal system (Penrol & Heuer, 1998)
 - However, there are differences between jury systems in different countries
 - And the extent to which jury's are used in criminal cases.
- What do we know about the mechanisms of cognition that could explain how and why jury's come to certain decisions regarding a suspect?

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FACTOR THAT MAY INFLUENCE JURY DECISIONS

- Knowledge of prior convictions
 - White paper on Criminal Justice (2002)
 - Prior convictions are a form of pre-trial information that may bias jury's decisions.
 - Jury may believe past behaviour will predict future behaviour
 - This has some basis but invokes a criminal stereotype
 - Recommends prior convictions are not disclosed

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FACTOR THAT MAY INFLUENCE JURY DECISIONS

- Trial Publicity:
 - In the US, the media can view court cases and interview jury
 - In the UK there are more restrictions
 - Media reporting on cases (before/during) could influence jurors
 - If jury has been exposed to trial publicity then questions about their suitability for making fair decisions are raised.

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FACTOR THAT MAY INFLUENCE JURY DECISIONS

■ Psychological research involving juries:

- Mock jury's and mock jury paradigm
 - Enables direct manipulation of variables
- Case studies and archival evidence
 - Post-hoc and observational
- Post-deliberation interviews
 - Not able to do this everywhere

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FACTOR THAT MAY INFLUENCE JURY DECISIONS

■ Different types of pre-trial publicity can influence juries, and this has been examined in mock jury paradigms:

- E.g., Otto et al. (1994): examined three aspects of biasing:
 1. Different effects of several different types of pre-trial publicity
 2. Impact the presentation of trial evidence on biases created by pre-trial publicity
 3. Psychological processes pre-trial publicity operate on biases
- "Jury" was exposed to pre-trial publicity (newspaper articles) about the defendant's character, inadmissible statements by a neighbour (weak and strong), prior police record, low status job, prior to viewing the trial.

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FACTOR THAT MAY INFLUENCE JURY DECISIONS

- Otto et al. (1994):
 - Results: pre-trial publicity (negative info in particular) about the defendant's character influenced initial judgments about guilt.
 - The bias was weakened, but not eliminated by the presentation of trial evidence.
 - Character pre-trial publicity, and both weak and strong inadmissible statements changed initial judgments of guilt.
 - This initial judgment then affects the way subjects assessed the evidence presented in the trial and the attributions they make about the defendant.
 - Prior record pre-trial publicity appears to have its effects by influencing inferences about the criminality of the defendant and this is related to post-trial judgments.

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FACTORSTHAT MAY INFLUENCE JURY DECISIONS

- Emotionally charged vs. Neutral pre-trial publicity
 - Kramer et al. (1990)
 - Pre-trial publicity shown to jury was either
 1. Past conviction for armed robbery + evidence at flat
 2. Plus fatal hit and run of child with the car used in robbery
 - Jury then watched a video of a re-enactment of a real trial for armed robbery and told to ignore the pre-trial publicity
 - Results: 20% increase in the number guilty verdicts given when the emotional pre-trial publicity was given
 - This rose to 41% when hung jury's were factored out

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FACTORSTHAT MAY INFLUENCE JURY DECISIONS

- However; a meta-analysis by Steblay et al. (1999) notes there are moderator variables that influence the pre-trial publicity – guilty verdict relationship:
 - Use of surveys
 - Use of mock jury
 - Use of general public or students
 - Real cases vs. fictitious cases
 - The type of crime – e.g., involving drug use, sexual abuse, murder, disorder-conduct, personal injury
 - Delay between exposure to publicity and making the decision
 - The source from where the publicity came – e.g., TV, internet, newspaper
 - The type of publicity – e.g., vague/specific
 - The content included – e.g., low status job, confession, prior-record

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FACTORSTHAT MAY INFLUENCE JURY DECISIONS

- Does pre-trial publicity influence jury decision?
 - Small but significant effect
 - This effect seems to be more pronounced for violent crimes
 - In the UK safety measures are implemented such as stopping the media from reported on cases at certain points and not allowing the interviewing of jurors.

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THEORY OF DECISION MAKING IN OTHER REAL-WORLD SETTINGS

- When definition of a signal or category is not clear, **fuzzy logic** is used to represent data through SDT.
 - Parasuraman et al. (2000) developed equations for fuzzy SDT by combining SDT and fuzzy logic.
 - Fuzzy logic allows an event to belong to more than one set.
 - Like a grey area – e.g., varying temperatures can belong to varying levels of comfort (not just dichotomous category).
 - **Mapping function**: describes the degree of membership.

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THEORY OF DECISION MAKING IN OTHER REAL-WORLD SETTINGS

- An event can belong to the set “signal” with some degree between 0 and 1 and the response can belong to the set “response” with membership in the range of 0 and 1.
- Once the set and response are mapped on to the range, event membership to 4 “fuzzy” outcome categories (hits, miss, FA, CR) can be computed (See Parasuraman et al., 2000 for formulas).

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APPLICATION OF FUZZY SDT TO REAL-WORLD DECISION MAKING

- Air traffic control: flight conflict detection.
 - One lab and one field study (Masaloni & Parasuraman, 2003)
 - Fuzzy SDT analysis resulted in more conservative response bias compared to standard SDT.
 - Events falling outside of criterion in SDT was defined by fuzzy SDT as worthy of attention.
 - Fuzzy SDT provides more complete picture of performance in conflict detection tasks.



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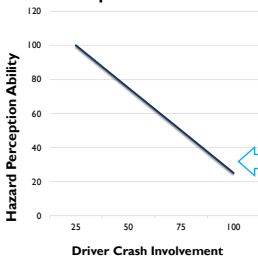
APPLICATION OF FUZZY SDT TO REAL-WORLD DECISION MAKING

- Sporting decisions (MacMahon & Starkes, 2008).
- Asked umpires, players, & participants with no baseball experience to make decisions on strikes.
- As expected from fuzzy SDT (i.e., signal being context-dependent) strike calls depended on the type of ball being played.

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APPLICATION OF FUZZY SDT TO REAL-WORLD DECISION MAKING

- Perception of road hazards and driving safety



BUT

- Evaluation of this type of data needs to be more sensitive to individual differences.
- Experienced vs. learner driver
- Wallis and Horswill (2007)
 - Tested 2 models:
 1. Learners = lower sensitivity discriminating hazards
 2. Learners = higher threshold for perceiving situation as dangerous

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APPLICATION OF FUZZY SDT TO REAL-WORLD DECISION MAKING

- Use of fuzzy SDT analysis (which considers degree of membership in safe vs. dangerous driving) supported second model.
- Also, training learners to anticipate potential hazards from environmental cues improved criterion placement
 - Suggests they were then using same model as experienced drivers.

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APPLICATION OF FUZZY SDT TO REAL-WORLD DECISION MAKING

- Detection of weapon by airport security (McCarlet et al., 2004)
- Detection on radar (Mackworth, 1948)
- Detection of malignant tumour on x-ray plate (Swets, 1998)
- Malfunction of system in nuclear power plant (Sorkin & Woods, 1985)
- Identity of a target on a battlefield (Holland & Neyedli, 2011)

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APPLICATION OF FUZZY SDT TO REAL-WORLD DECISION MAKING

- Air traffic control event (Metzeger & Parasuraman, 2001)
- Untruthful statement on a polygraph (Ben-Shakhar & Elaad, 2003)
- Detection of hazard when driving (Wallis & Horswill, 2007)
- Crossing a railway line (Yeh, Multer, & Raslear, 2009)
- Detecting a broken element on an aircraft (Drury, 2001; Swets, 1998)

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