Who Gave You Driving License?

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How many factors gathered to yield one road accident?

* Infrastructure flaws
* The weather
* Vehicle problems
* The human being

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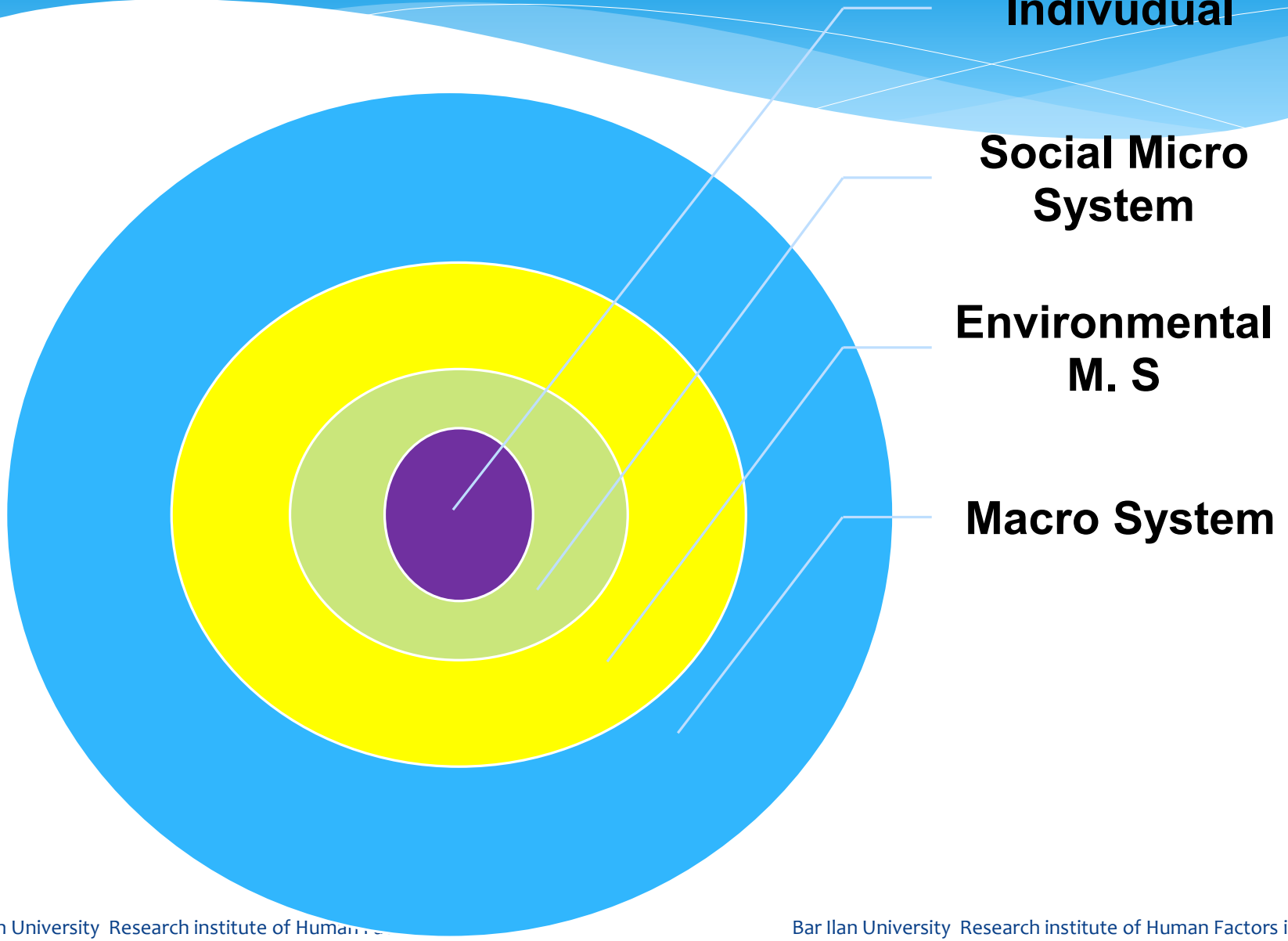
Figure 1: Framework of individual, social, and environmental factors intervening in drivers' risk using an ecological systems model (Bronfenbrenner, 1979).



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INDIVIDUAL

Gender
Age
Personality
Cognition
Driving Skills

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Social Micro System

* Parents
* Peers
* Experience
* Education

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Environmental Micro System

* Road type
* In vehicle technology
* Day / Night

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Macro System

* Culture
* Laws
* Safety campaigns
* Financial crisis

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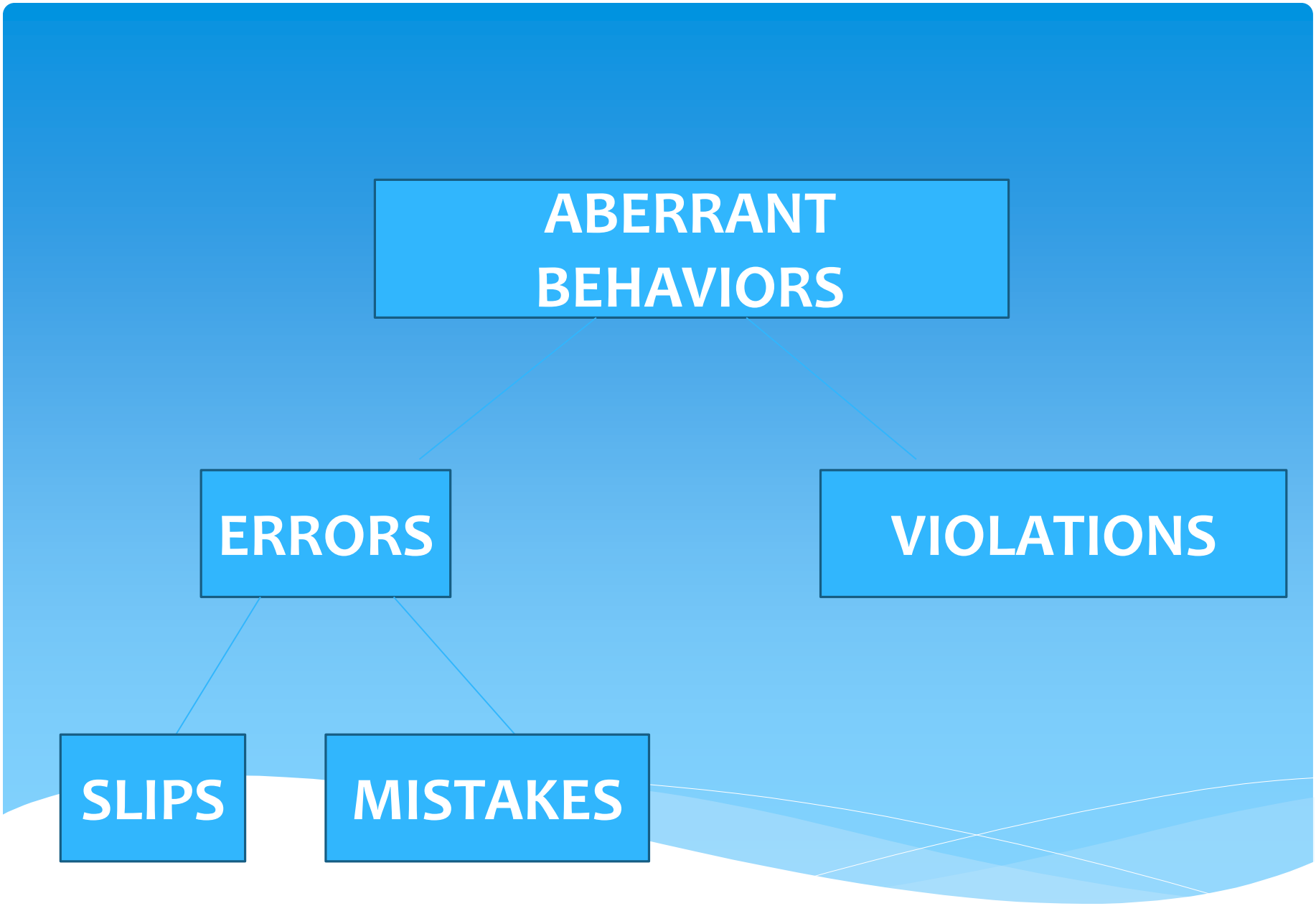
ABERRANT BEHAVIORS
ERRORS
VIOLATIONS
SLIPS
MISTAKES

DBQ (Reason et al., 1990)

- **Violations are "deliberate deviations from the law"**
- **Errors are "failure of planned actions to achieve their intended consequences"**

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ERRORS

- Slips are actions that do not have the intended consequences (Parker, 2007).

- Mistakes refer to failures in the plan of action; even if execution of the plan is done correctly, the intended outcome is not achieved (Parker, 2007).

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GENDER

* Generally, Males are involved much more in fatal accidents
* Males commit much more violations
* Males commit more mistakes
* Females are involved mostly in mild accidents and much less accidents than males do
* Females commit more slips

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GENDER

Males express on road much more driving anger (road rage), impulsiveness and aggression

(Freeman, J., Kaye, S. A., Truelove, V., & Davey, J. (2017)

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GENDER

Male drivers:

* **Engage in risky driving behaviors more frequently than females**
* **Have greater number of fines and accidents**
* **More prone to violating traffic regulations**
* **Are angrier at police presence (Butters, Mann, Wickens, & Boase, 2012 Scott-Parker, 2017).**

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GENDER

The basis for these differences may be due to neurochemical structure of humans, hormonal process, global socialization practices, and many other reasons (Amarasingha & Dissanayake, 2014).

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* However, studies based on crash data report that older females are overrepresented in crashes compared to males (Classen, Wang, Crizzle, Winter, & Lanford, 2012).
* The causes for this over representation have been identified as errors of yielding and gap acceptances.

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AGE

YOUNG DRIVERS

OLD DRIVERS

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AGE

Young drivers are involve in more fatal accidents than non-young drivers

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AGE

Teenagers and young adults experience physical, mental, and social changes that, together with inexperience behind the wheel, can impact negatively on driving performance (Glendon, 2011; Scott & Parker, 2017).

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AGE

Parts of the brain that are crucial to safe driving, such as the prefrontal cortex which is involved in attention and decision-making, may not be fully developed up to the age of 25.

This limits a young motorist's ability to deal with complex road situations (Glendon, 2011; Romer, Lee, McDonald, & Winston, 2014; Underwood, 2007).

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AGE

- Brain and emotional development can limit the level of psychosocial maturation and behavioral control displayed by young individuals.

- This make them more prone to unsafe driving behaviors: Speeding, drink & driving, distracted driving, not wearing seat belts, etc (Begg, Brookland, & Connor, 2017; Bingham, 2014)

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AGE – ELDERLY DRIVERS

- Even though there may be signs of a moderate decline in mentation and psychomotor, and auditory functions of older drivers , many of them still drive safely.
- The explanation to this is that most driving patterns of elderly drivers are learned during many years, embedded in long-term memory, and become second nature.

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* In addition, older drivers tend to regulate their own driving with time.
* They drive shorter distances and fewer miles, and they drive minimally at night and seldom during rush hour.
* Generally, driving performance of elderly drivers may become impaired only after a significant loss of function occurs (Dattoma, 2017).

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Interaction of age and gender

- Bingham, C. R., & Ehsani, J. P. (2012). younger male drivers were more likely to be involved in single-vehicle and fatal head-on crashes while female drivers were more likely to involve in left- and right-hand crashes.

- Younger female drivers were more likely to be involved in fatal rear-end crashes compared to younger male drivers.
- Younger female drivers were about twice as likely to be involved in leftside crashes compared to younger male drivers.

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Interaction of age and gender: Elderly Drivers

* **Classen, S., Wang, Y., Crizzle, A. M., Winter, S. M., & Lanford, D. N. (2013**

* **Males reported fewer driving errors but had more traffic violations compared to females (de Winter and Dodou, 2010).**

* **However, crash database studies showed that older females incur different violations or errors compared to males, namely failing to yield or failing to obey traffic control signals, make less over-speeding errors (Classen et al., 2010; Hu et al., 1998; Stamatiadis, 1996).**

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* Moreover, crash rates and types of crashes are different among older females.
* Compared to males, older females are overrepresented in crashes at urban settings and at intersections, and make more right-angle and angle-whileturning accidents (Stamatiadis, 1996).

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* Older female drivers are also at a greater risk for crash related injuries and fatalities from being generally more frail than males (Awadzi et al., 2008).
* As such older female drivers emerge as a high risk group demanding strategies for risk reduction and safe driving performance.

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Personality

* **Impulsiveness**
* **Conscientiousness**
* **Self-monitoring**
* **Sensation seeking**

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Sensation Seeking

* **Sensation seeking is a syndrome typified by seeking after new, complex and intensive experiences.**
* **High Sensation seekers are willing to take physical, social and financial risks for having these experiences (Zuckerman, 1994).**

SENSATION SEEKING

It refers to four dimensions:

* Thrill and Adventure Seeking
* Experience Seeking
* Disinhibition
* Susceptibility to Boredom

(Zuckerman, 1994)

Individuals high in the 4 dimensions will choose in dangerous risky behavior especially at the roads

Sensation Seeking, Gender and Age

* **Sensation seeking levels are higher in men than in women.**
* **Also, men would estimate a situation less dangerous than women (Rahmani & Lavasani, 2012).**
* **SS decreases with age, especially Disinhibition (Constantinou et al., 2011).**

Two theories may explain the high activity of sensation seekers :

1. **Risk homeostasis** (wilde, 1972)
2. **Zero Risk** (Naatanen & Summala, 1974)

Risk Homeostasis

This model leans on the assumption that in every activity people subjectively estimate the risk level that is involved in the situation (Wilde, 2001).

* Every person has a risk level that fits her / his personality (target level of risk).

* In each situation in driving, for example, the driver makes an assumption how dangerous it is and s/he will estimate the probability of an accident accordingly.

* Thus, this assumption is compared to the personal target of risk.

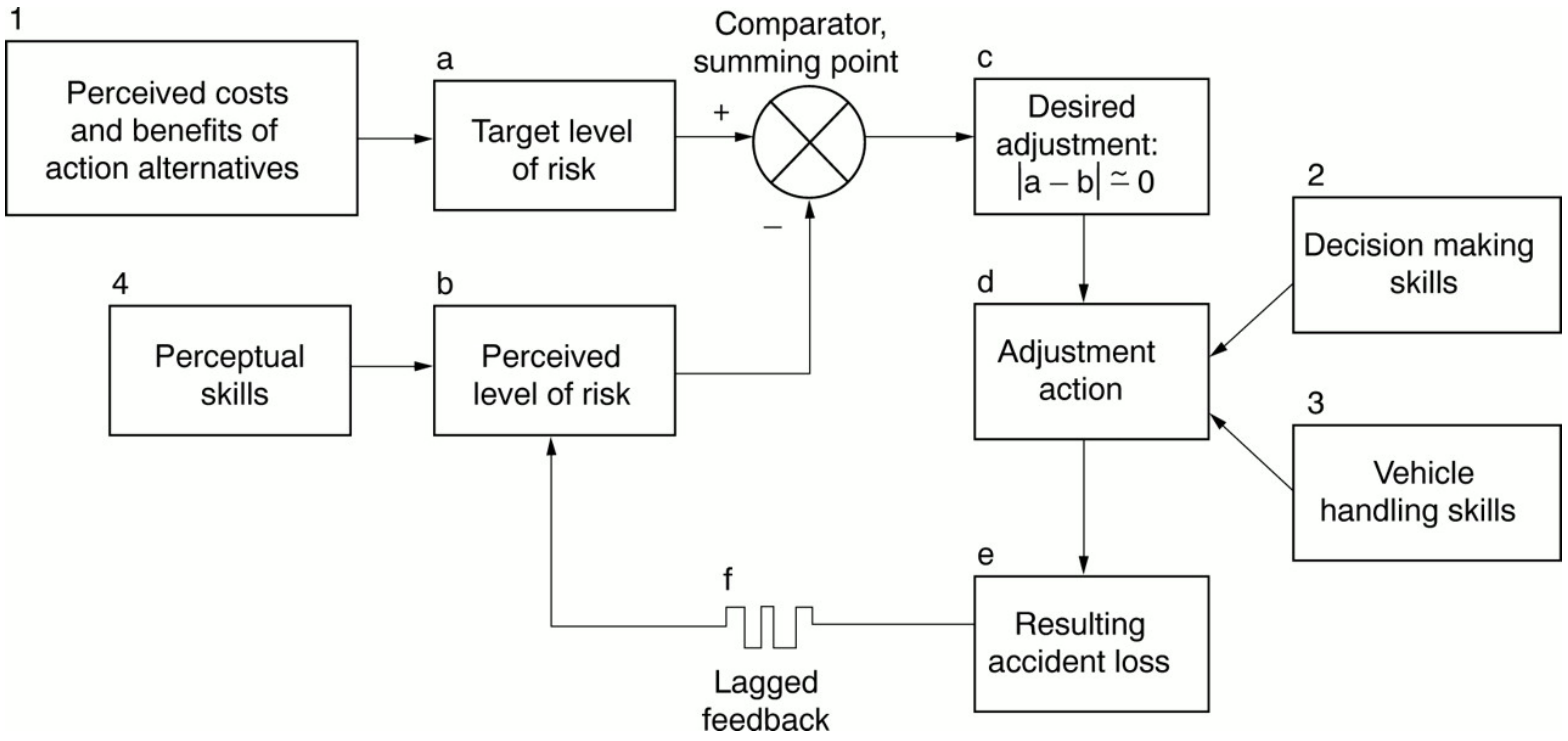
* The comparing process is automatic and the driver is mostly not aware of doing it. This comparison can lead the driver to a behavioral adaptation, for example, by slowing.

So, the mechanism of risk homeostasis is reflected in the comparison between the perceived level of risk (the way the driver analyses the situation) and the target level of risk.

* There is a negative correlation between the perceived level of risk of the driver and the level s/he is willing to take risks in driving.

* The lower the perceived level of risk, the higher the level of risky behavior of the driver and vice versa. When the driver estimates the situation as highly dangerous s/he will decrease the risky behavior.

* The individual acts as in a loop: s/he compares the target of risk to the perceived risk.
* If the perceived risk is higher than the target level, s/he will decrease the risky behavior and vice versa.


1
Perceived costs and benefits of action alternatives
a
Target level of risk
Comparator, summing point
+
–
c
Desired adjustment: |a – b| ≃ 0
2
Decision making skills
4
Perceptual skills
b
Perceived level of risk
d
Adjustment action
3
Vehicle handling skills
e
Resulting accident loss
f
Lagged feedback

PRACTICAL IMPLICATIONS

* Frequently, the authorities widen the roads in purpose of making them safer.

* However, for drivers, that will now estimate the risk of the road as lower as a consequence of its widening, this possibly may yield a riskier driving by speeding or overtaking.

Zero Risks Theory

* The concurrent theory for the homeostasis of risk theory is Zero Risk theory (Naatanen & Summala, 1974).

* This theory asserts that drivers in any case tend to lower the perceived risk of a situation (derive to zero risks).

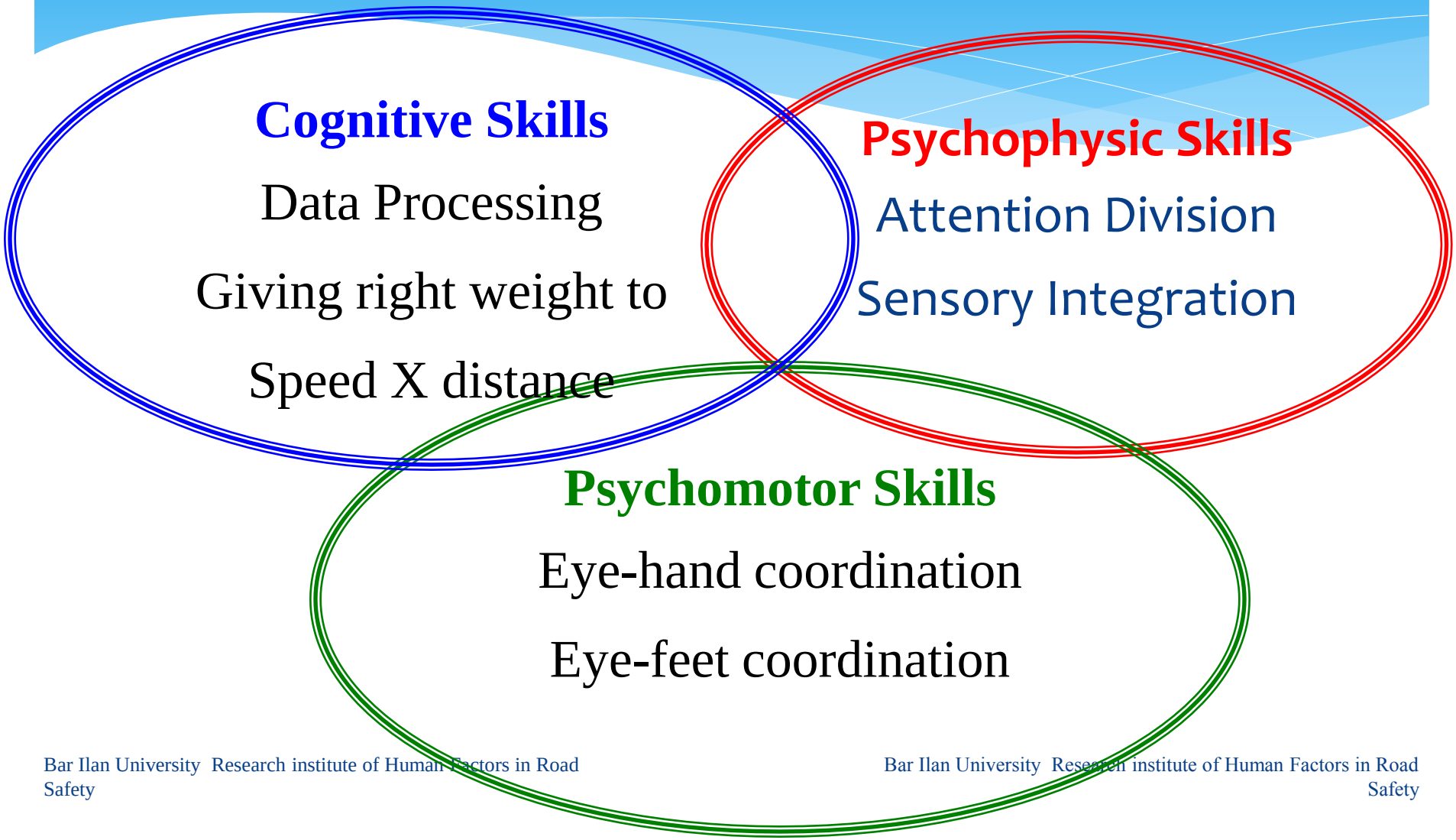
Zero Risk

In order to avoid anxiety and uncomfortable feelings drivers tend to adopt the feeling that the situation is not dangerous at all.

It is very easy to adopt the state of mind that “it will not happen to me”.

McKenna (1993) asserted that sometimes drivers have control illusion that derives of over optimism and over estimation of driving skills and safe driving.

Driver's Skills



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DRIVING SKILLS

Skills such as visual search, hazard perception, inhibition of distractions, and decision-making, which are related to executive function, are crucial to effectively control a vehicle and pay attention to what is happening on the road (Glendon, 2011).

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Cognitive Elements

- ☆ Knowledge of safety principles
- ☆ Knowing the way
- ☆ Awareness to self limitations
- ☆ Attitudes
- ☆ Awareness to safety

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States

Psychological State

- Stress
- Time Pressure
- Mortality

Salience

Physiological State

Fatigue

Drugs

Alcohol

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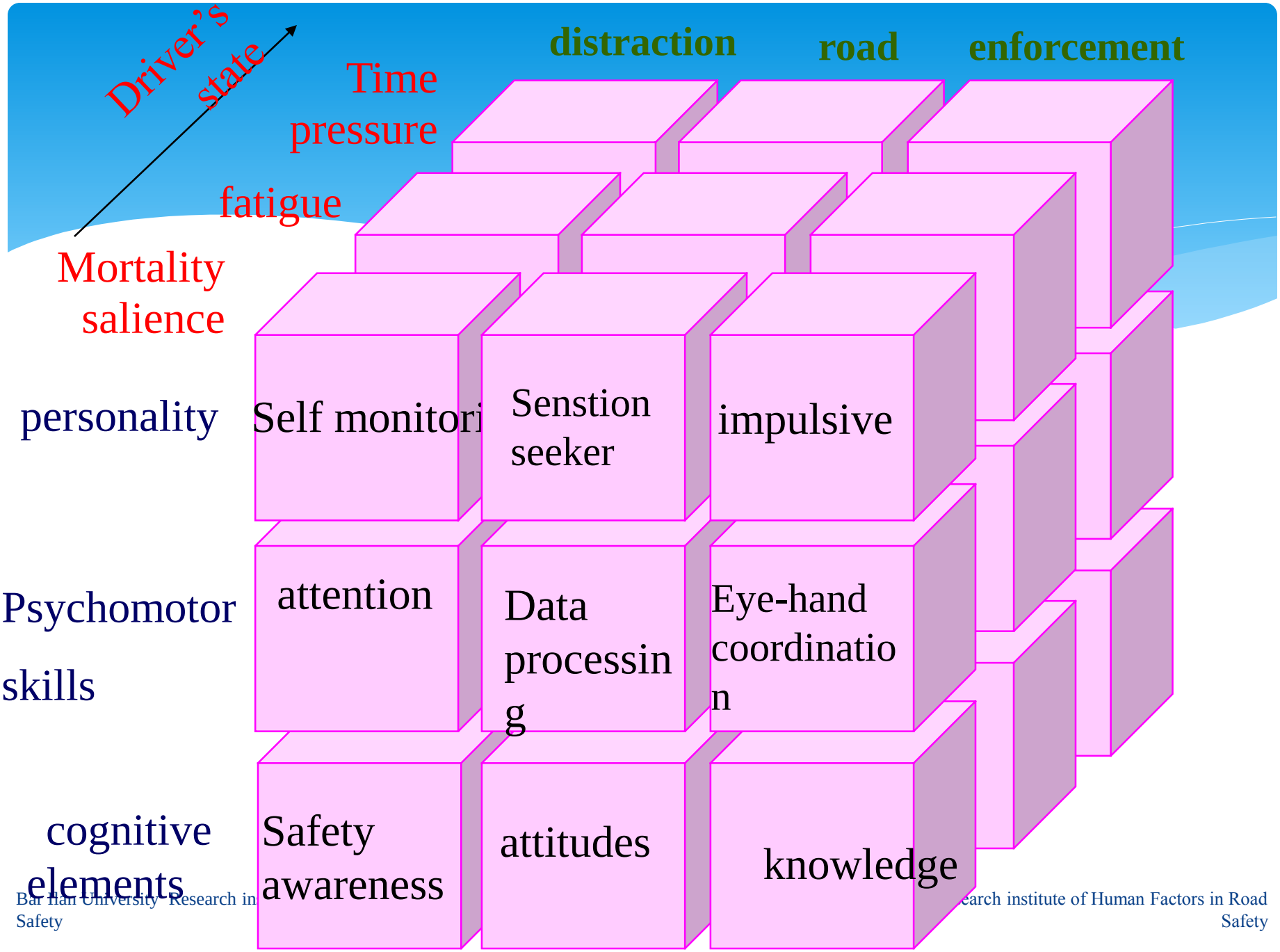
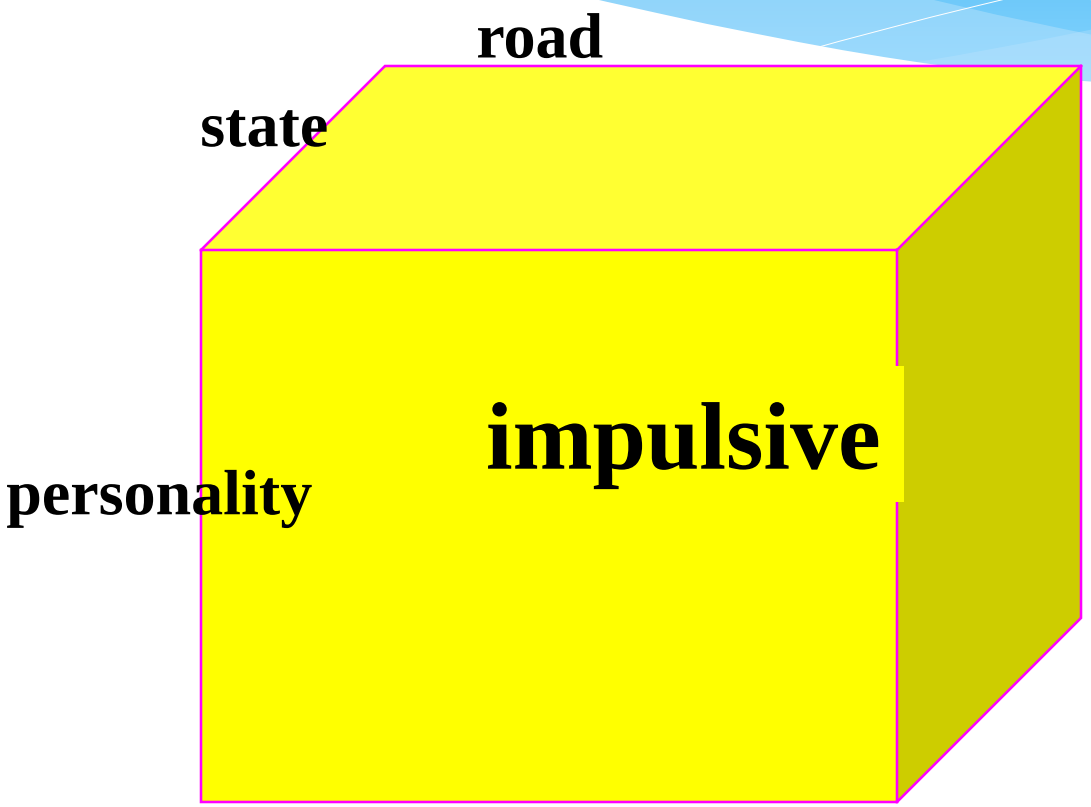

Driver's state
distraction
road
enforcement
Time pressure
fatigue
Mortality salience
personality
Self monitori
Senstion seeker
impulsive
Psychomotor skills
attention
Data processing
Eye-hand coordination
cognitive elements
Safety awareness
attitudes
knowledge



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So, after understanding what's in the first circle (individual) let's go to the second circle… etc.

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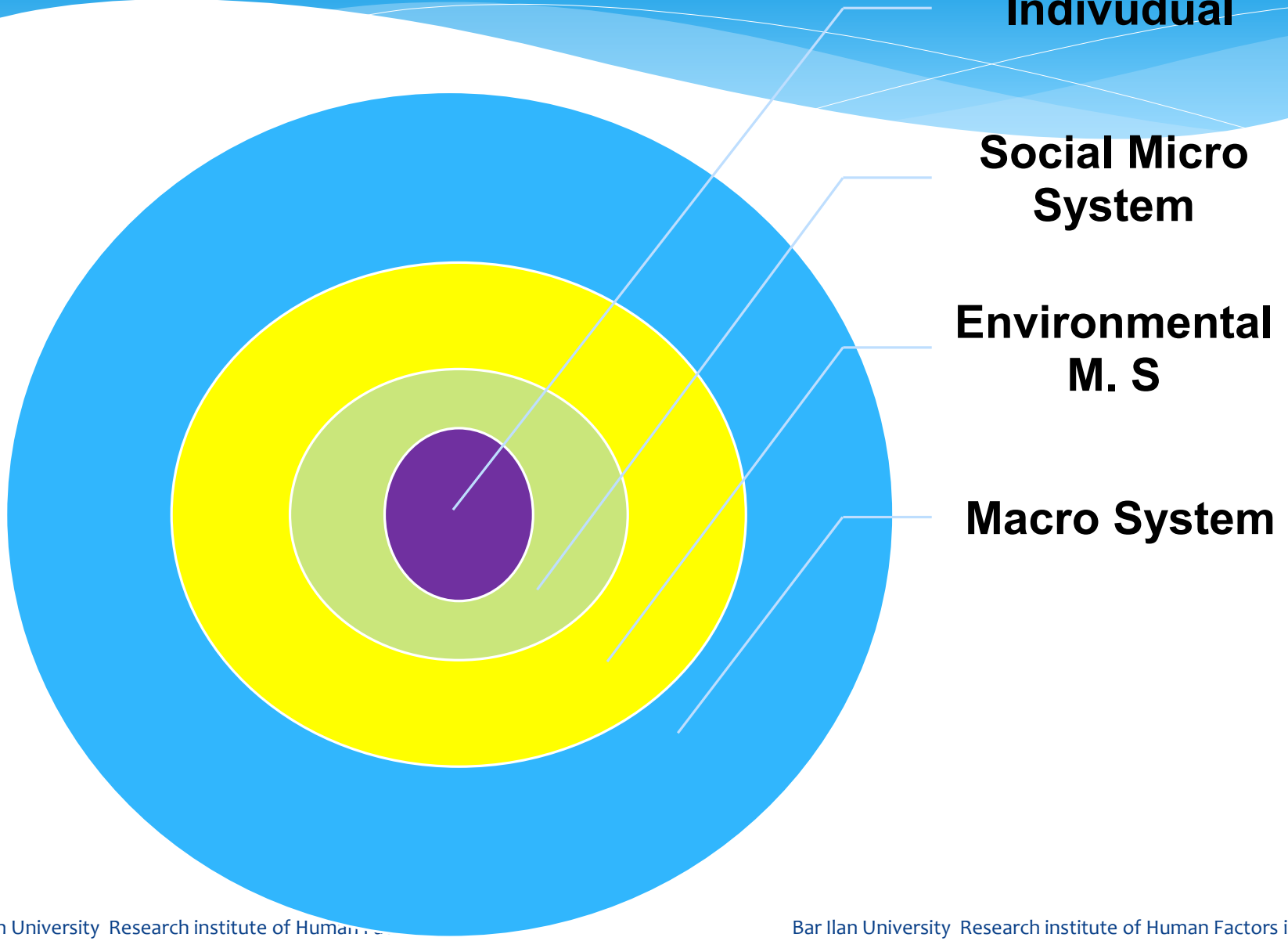

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*Thank you!

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