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**Norwegian University of  
Science and Technology**

## **Human dimensions in energy transitions – some examples**

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(Consumption, Environment & Traffic)

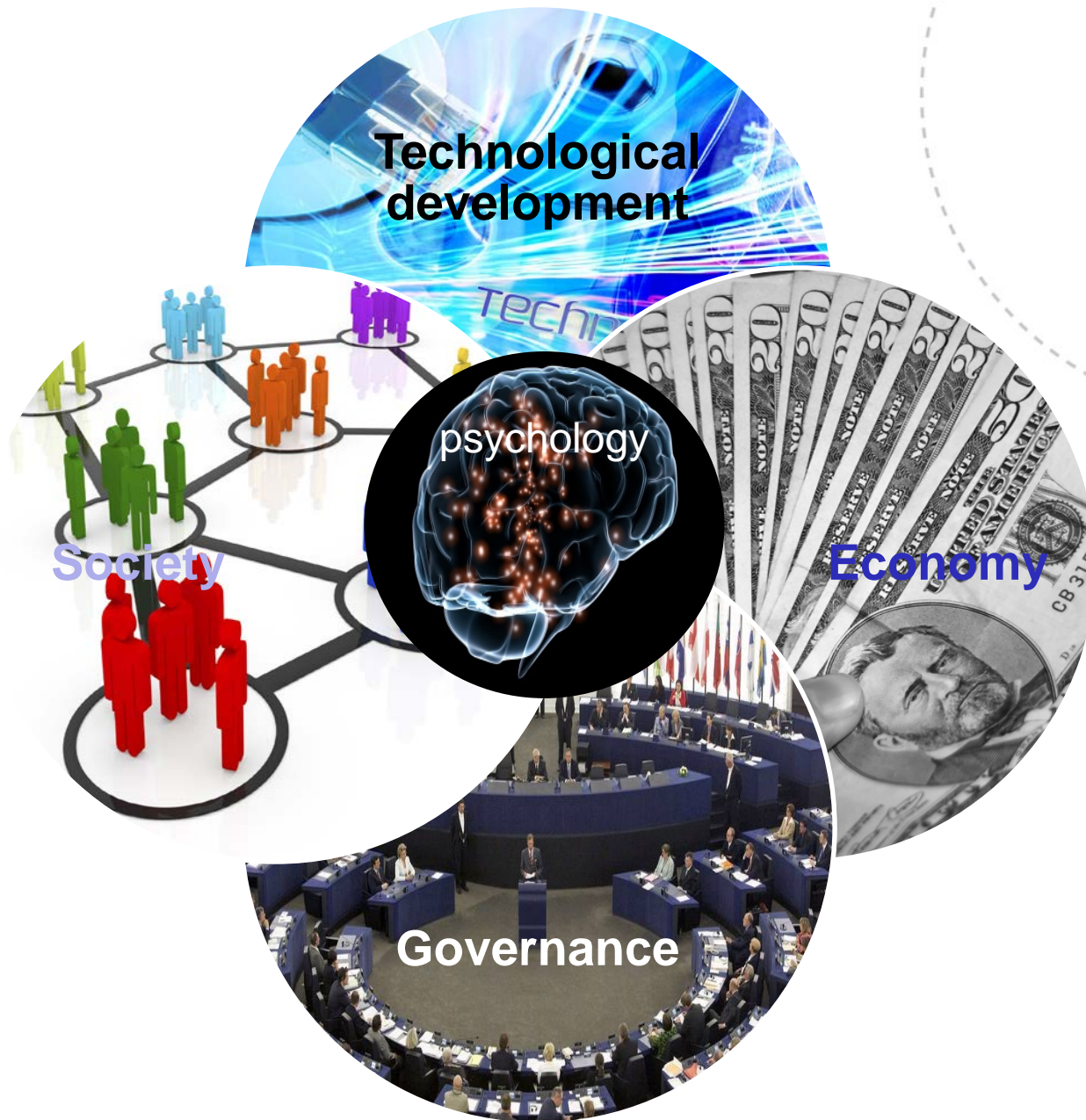
# Agenda

- Human components in energy transitions
- Behavior modelling
- Emotions, identities, memories (the ECHOES perspective)
- Behavior change modelling
- An example





## Human components in energy transitions





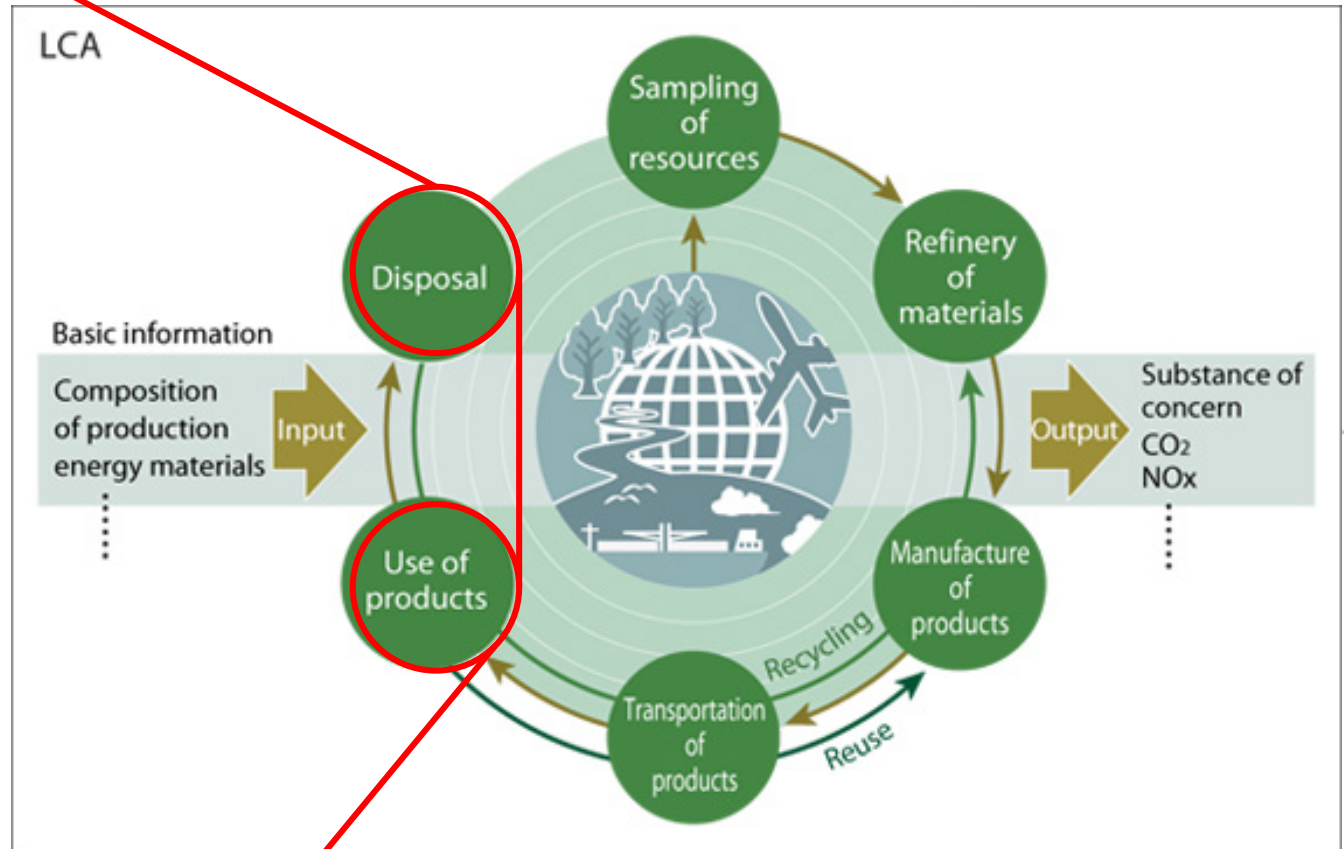
purchase



use



disposal



# Consumer participation in the lifecycle

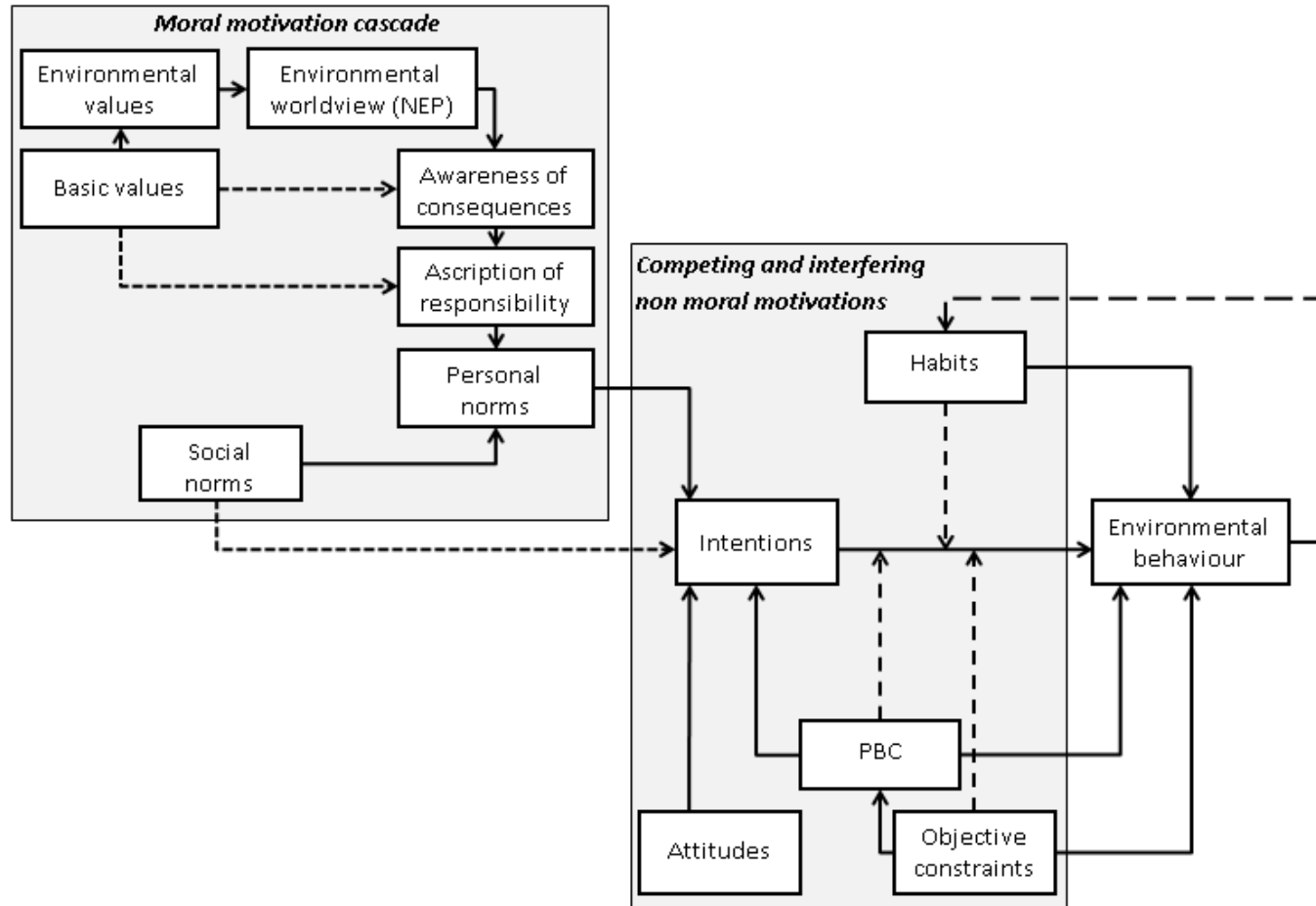


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# Behavior modelling



# Comprehensive Action Determination Model



Klößner, C. A. (2013). How Powerful are Moral Motivations in Environmental Protection?. In *Handbook of moral motivation* (pp. 447-472). SensePublishers.

# Emotions, Identities, memories – the ECHOES perspective

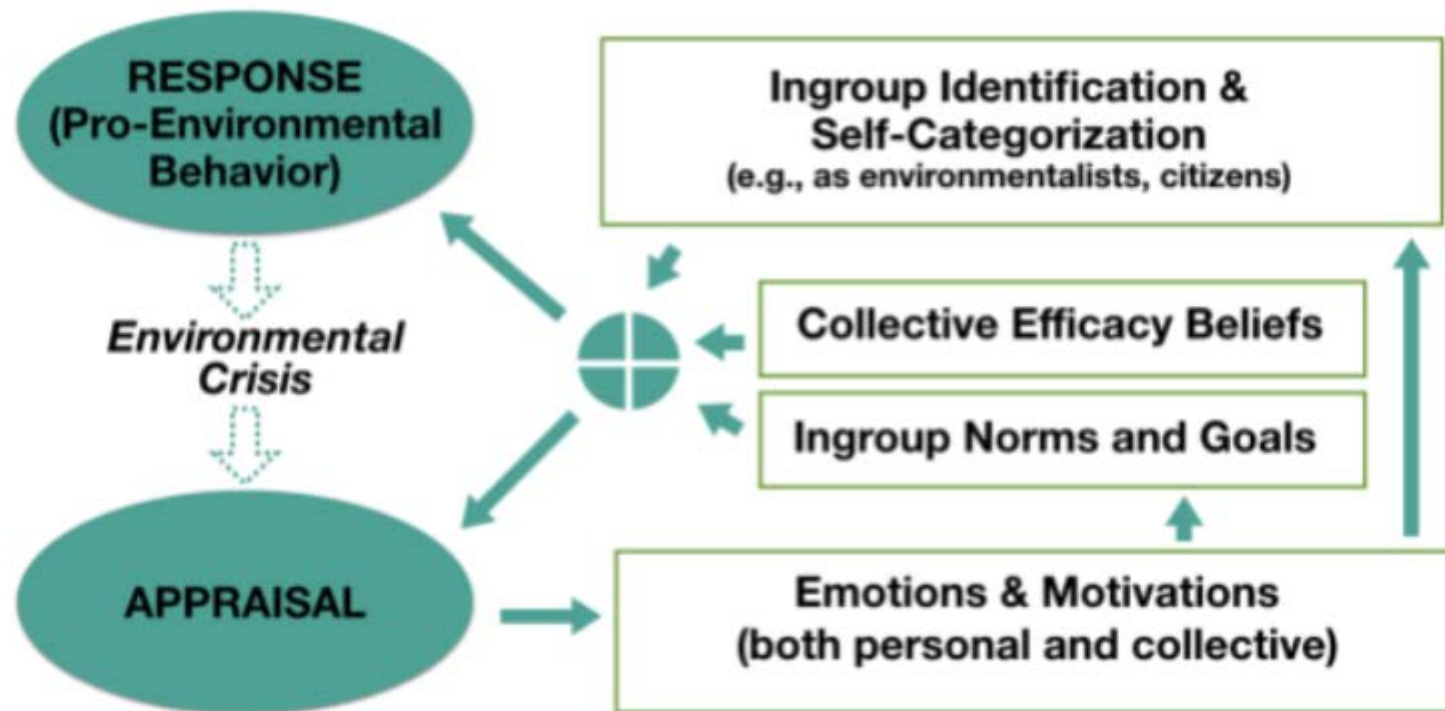


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# Social Identity Model of Pro-Environmental Action



Fritsche, I., Barth, M., Jugert, P., Masson, T., & Reese, G. A social identity model of pro-environmental action (SIMPEA). *Psychological Review*.

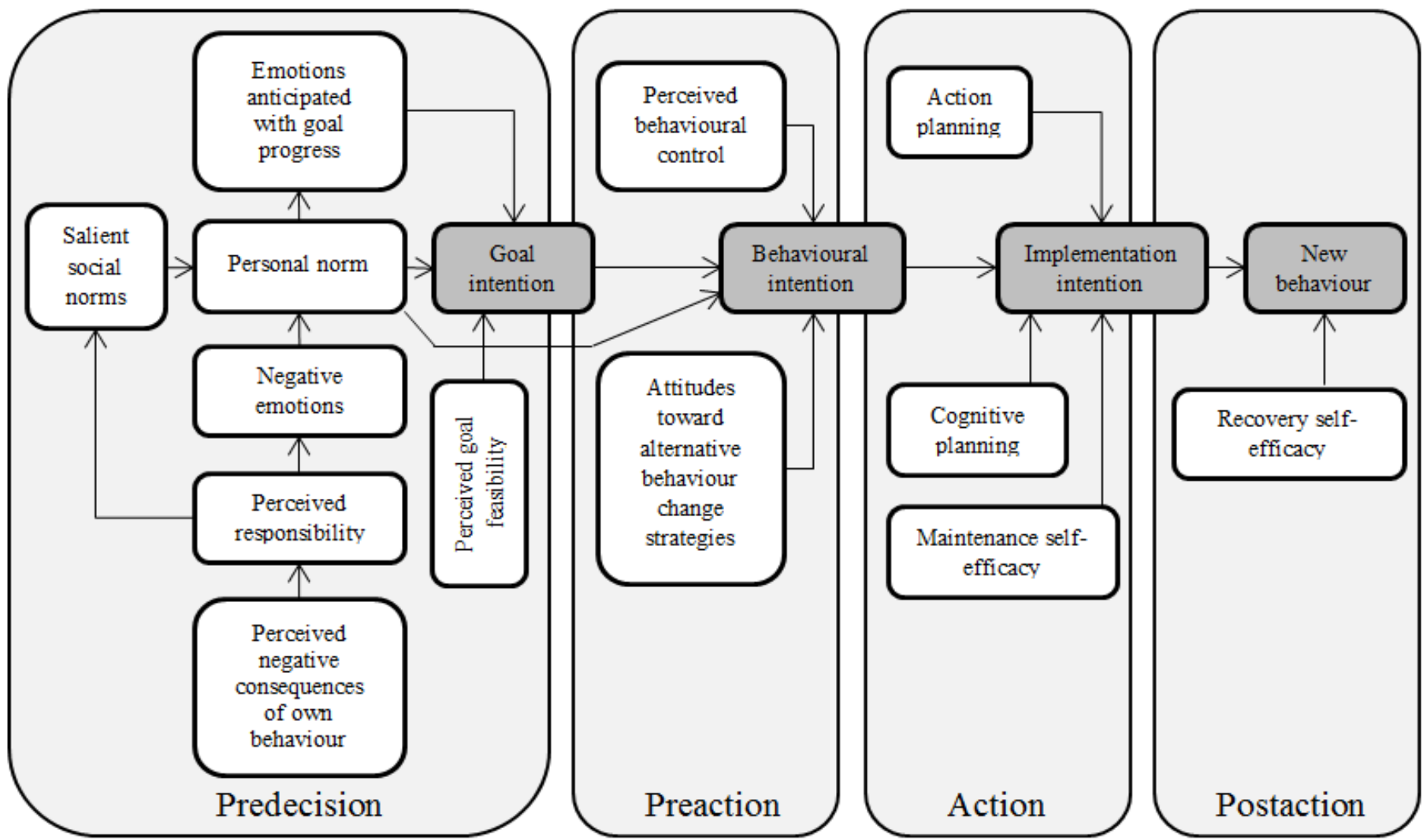
# Energy memories & lifestyles

- Energy memories store the collective history of energy experiences
- Energy memories are impacted by historical developments and big events (e.g., Fukushima, discovery of oil in Norway)
- Such memories frame how energy is used and conceptualized
- There is heterogeneity in how groups of people use energy → lifestyles



# Behavior change modelling

# Self-regulation model of behaviour change



Bamberg, S. (2013). Changing environmentally harmful behaviors: A stage model of self-regulated behavioral change. *Journal of Environmental Psychology*, 34, 151-159.



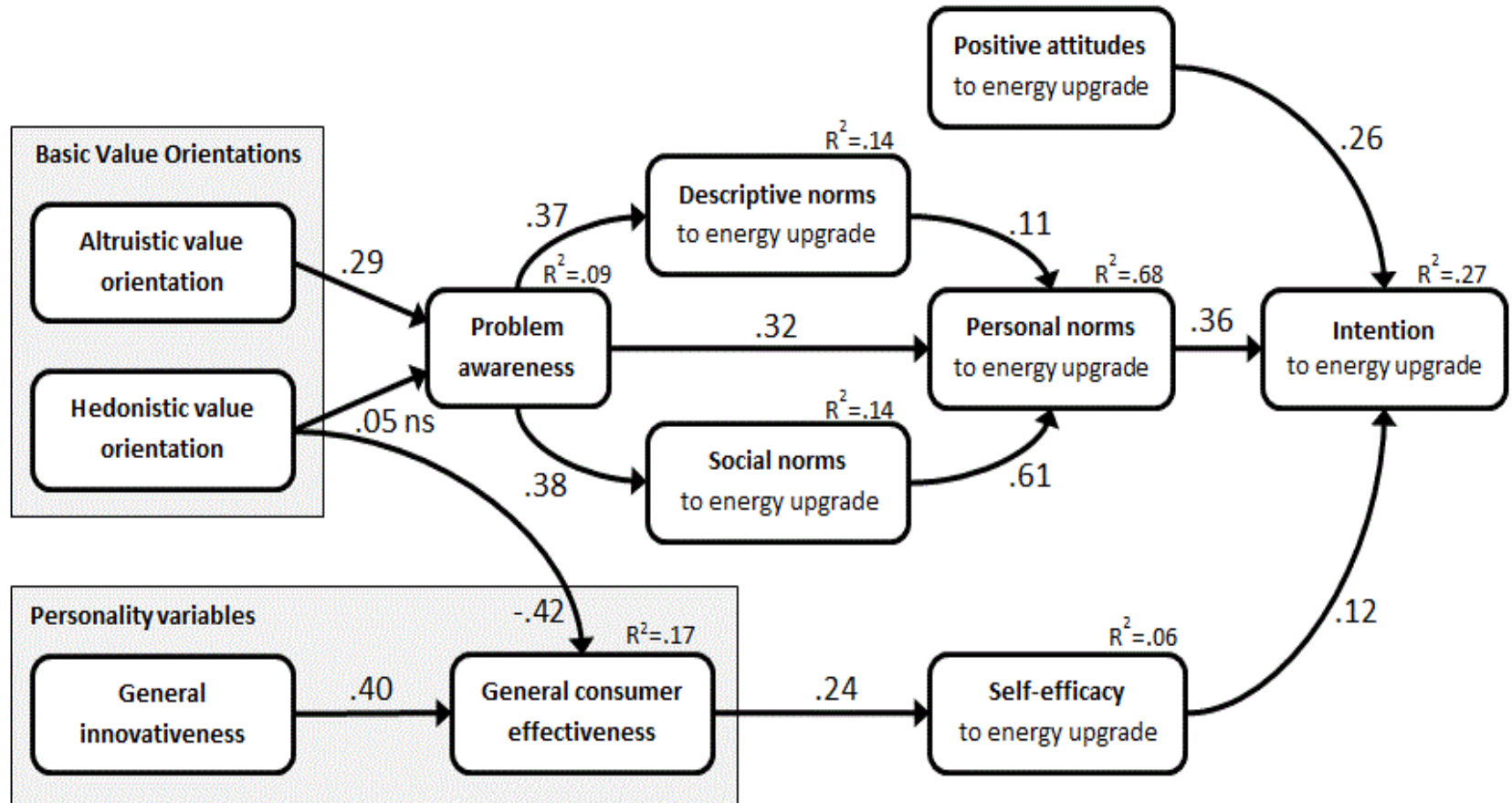
# An example



# Sample

- Representative for Norway (N=2.605) + oversampling of people in decision mode (N=1.182)
- Surveyed in January-March 2014
- 49.5% female, 50.5% male
- mean age 49.7 years (*SD* 15.5)
- 75.4% owned, 11.7% owned through a housing cooperation, 12.9% rented
- 77.4% houses, 19.5% apartment houses, 3.2% other housing types

# Predictors of energy upgrades



Model fit:  $N=3758$ ;  $\chi^2=4293.07$ ,  $df=443$ ,  $p<.001$ ;  $RMSEA=.048$  [.047 .049];  $CFI=.90$ ;  $TLI=.89$ ;  $SRMR=.065$

Klößner, C. A., & Nayum, A. (in press). Psychological and structural facilitators and barriers to energy upgrades of the privately owned building stock. *Energy*.

# Barriers

- I do not own the dwelling
- The right point in time has just not come to upgrade
- Plans to move soon
- Building protection regulations prevent me from upgrading

- I do not manage to make a decision for what to do
- The right point in time has just not come to upgrade
- Unsure about the saving potential for energy costs after an upgrade
- Not enough economic resources
- Difficult to know if information about energy upgrades can be trusted

- Demands much time to supervise the contractors
- The right point in time has just not come to upgrade
- I do not manage to make a decision for what to do
- Not enough economic resources

Not in decision mode

Deciding what to do

Deciding how to do

Deciding how to implement

- Higher comfort levels expected after upgrade
- Better living conditions in the dwelling expected after upgrade
- Reduction of energy costs expected after upgrade
- Increased market value of the dwelling expected after upgrade
- Payoff of the investment within a reasonable time frame
- Positive health effects expected after upgrade
- The building standard of the dwelling is perceived as a waste of energy
- There are subsidy schemes in place supporting the upgrade
- (Unsure about the saving potential for energy costs after an upgrade)

- Information about energy upgrade is easily accessible
- Reduction of energy costs expected after upgrade
- Payoff of the investment within a reasonable time frame
- Positive health effects expected after upgrade
- Better living conditions in the dwelling expected after upgrade
- Higher comfort levels expected after upgrade
- There are subsidy schemes in place supporting the upgrade
- (Building protection regulations prevent me from upgrading)
- (I do not own the dwelling)

- Payoff of the investment within a reasonable time frame
- Higher comfort levels expected after upgrade

# Drivers

Klößner, C. A., & Nayum, A. (2017). Specific barriers and drivers in different stages of decision-making about energy efficiency upgrades in private homes. *Frontiers in Psychology*.





Thank you!