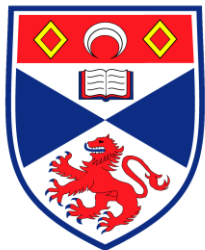




NANA: Novel Assessment of Nutrition and Ageing

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University
of
St Andrews



The
University
Of
Sheffield.



University of
Reading



Multidisciplinary Research Team:

- Psychology, University of St. Andrews**
- Nutrition, University of Sheffield**
- Human Computer Interaction, University of Reading**
- Engineering, Bath Institute of Medical Engineering**





NOVEL ASSESSMENT
OF **NUTRITION** AND AGEING

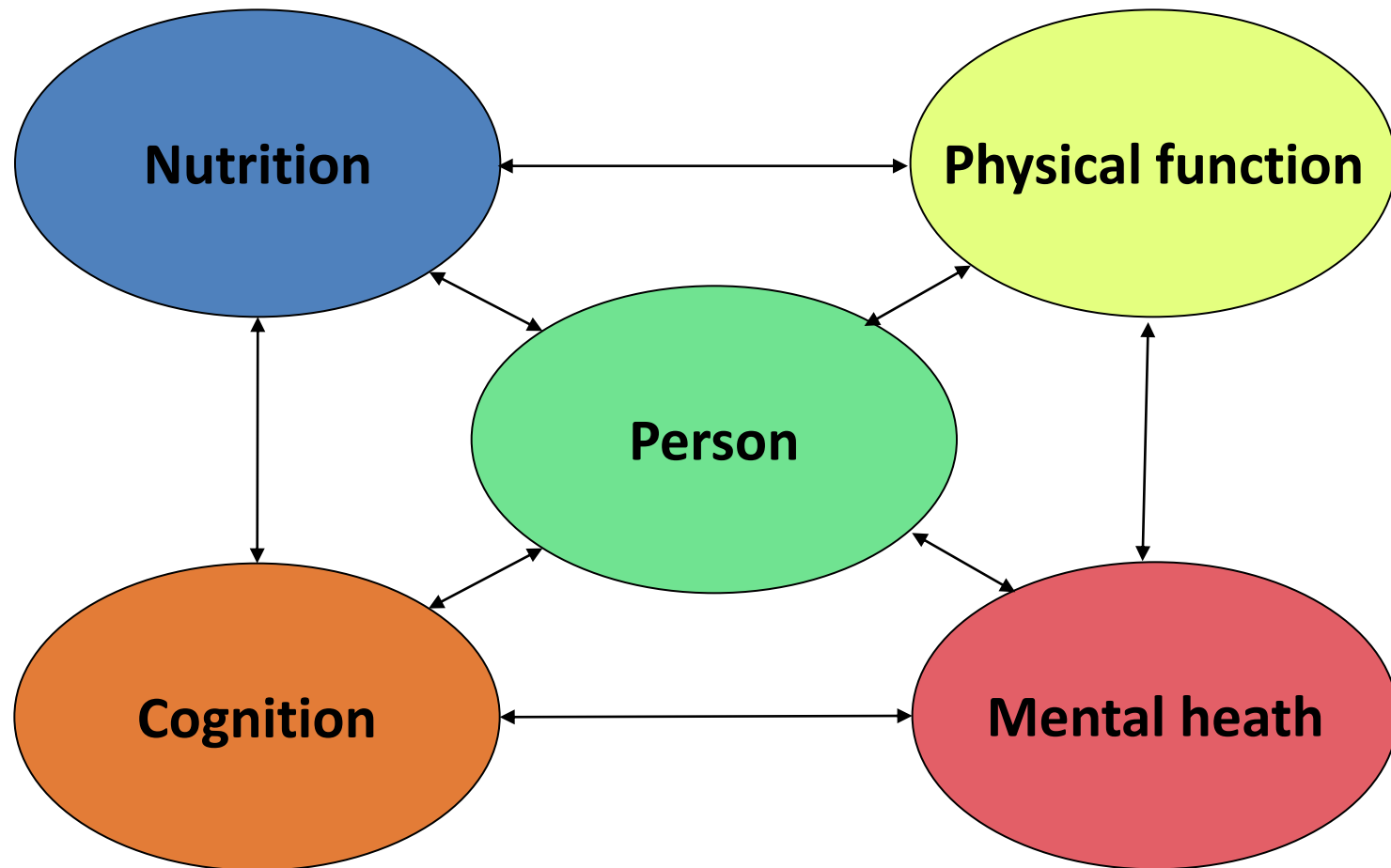
Background

- 1 in 3 people on admission to hospital are malnourished
- Levels of malnutrition in the community more difficult to assess 5-10%
- >30% of older adults have one or more micronutrient deficiencies
- Relationship between dietary intake, cognition, mental health & physical function are poorly defined.
- Current methods are inadequate for integrated and extended assessment of nutrition, cognitive, physical and mental health in older people



Aims

- To improve the assessment of dietary intake, physical health, mental health and cognitive function
- To improve understanding of the interactions between these factors.



The plan

Phase 1 – User needs analysis

Consultation with broad cross-section of older people, nutritionists and health professionals who work with older people, to establish what technical approaches would be useful and acceptable to all groups.

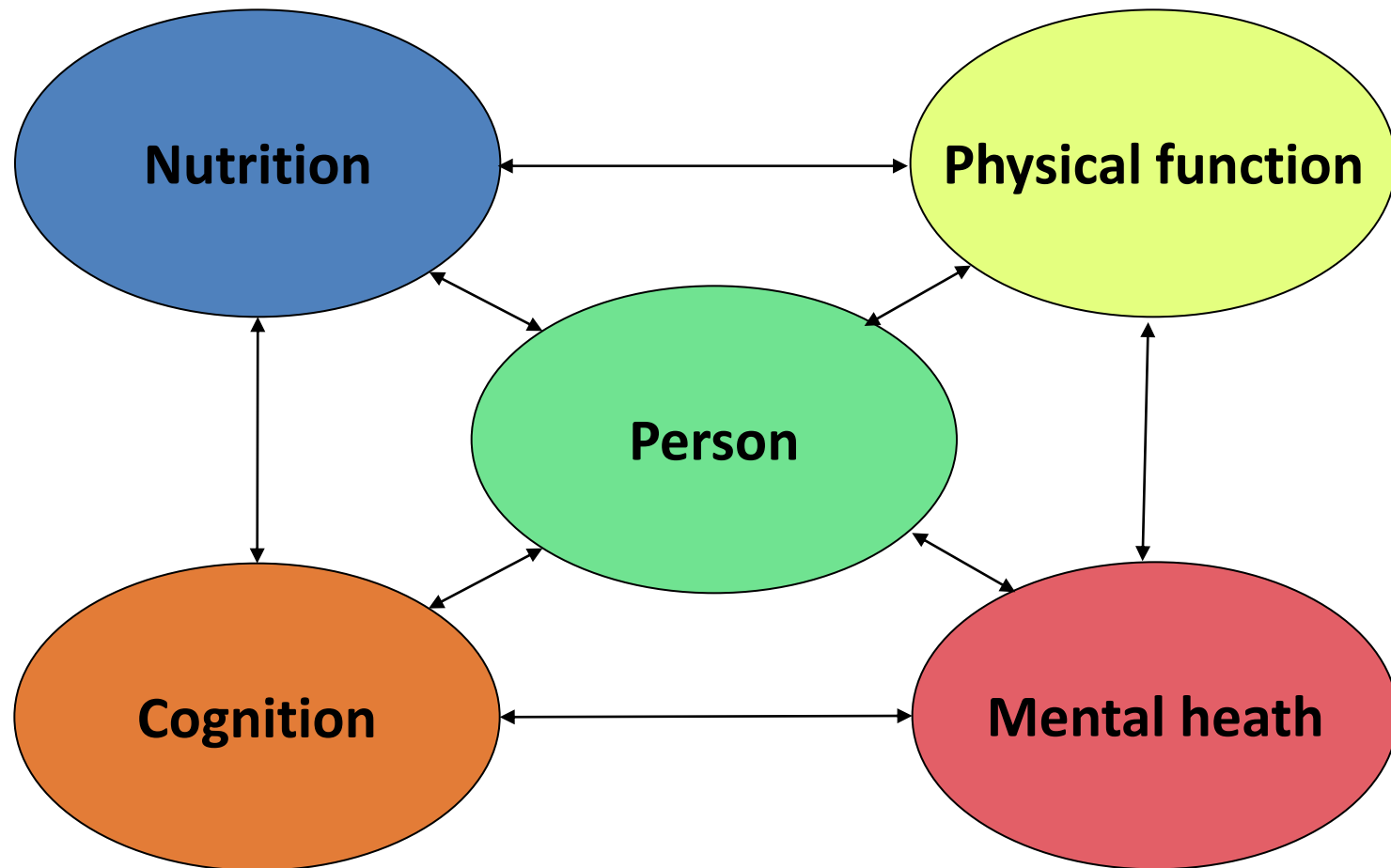
Focus groups

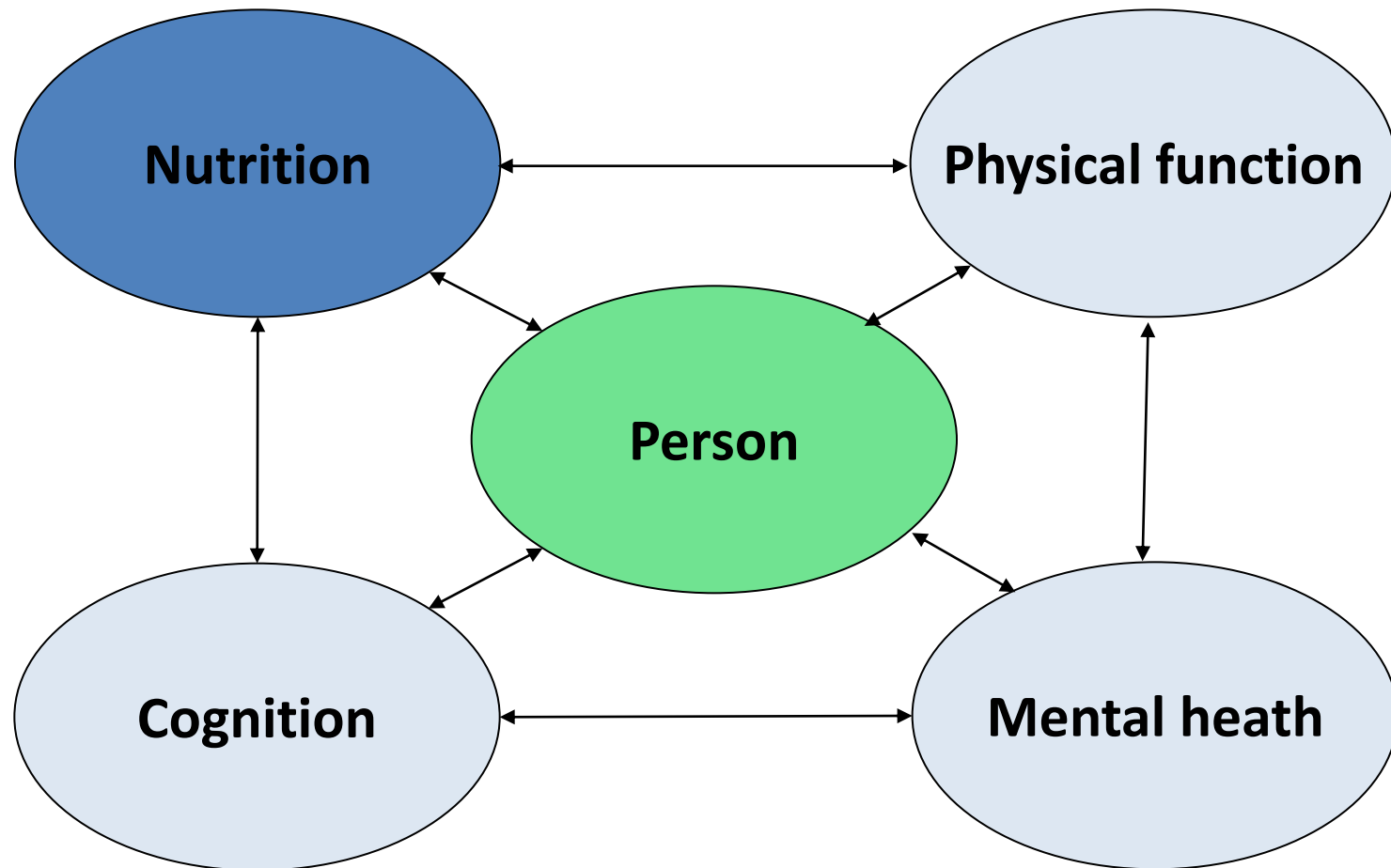
- 3 with adults aged over 65 years focusing on technology and prospective assessment = guidance for acceptability
- 2 with nutritional professionals focusing on current limitations to collecting good nutritional information = ‘wish list’
- 2 with mental health professionals focusing on current assessment and communication, plus obstacles = ‘wish list’

The plan

Phase 2 - Development of Integrated Measurement Toolkit:

1. Iterative development of assessment technology lead by Engineering and Software Development.
2. Dietary assessment techniques lead by Nutrition
3. Cognitive and mental health measure lead by Psychology
4. Physical function across disciplines





Current methods of dietary assessment

Collection

(USE AS MANY PAGES AS YOU NEED)

Time	Food and Drink Include Brand Name (if applicable), Flavour and Packet Weight Enter each food item on a new line	Cooking Method Eg fried, grilled, poached etc.	Estimated Portion Eg cup, slice, portion of family meal or portion photo code
7:0	tea 112		
9:0	coffee		
9:30	See Text		
10:0	coffee		
11:0	orange Juice		
12:15	meat Sandwich Tea		
3:0	Tea		
4:0	Banana		
5:0	Apple pie Tea		
6:30	coffee		
6:45	meat Sandwich Tea		
7:30	Tea		

Have you taken any supplements or non prescribed medication eg Vitamin tablets, paracetamol etc. Please specify.

Analysis





technology

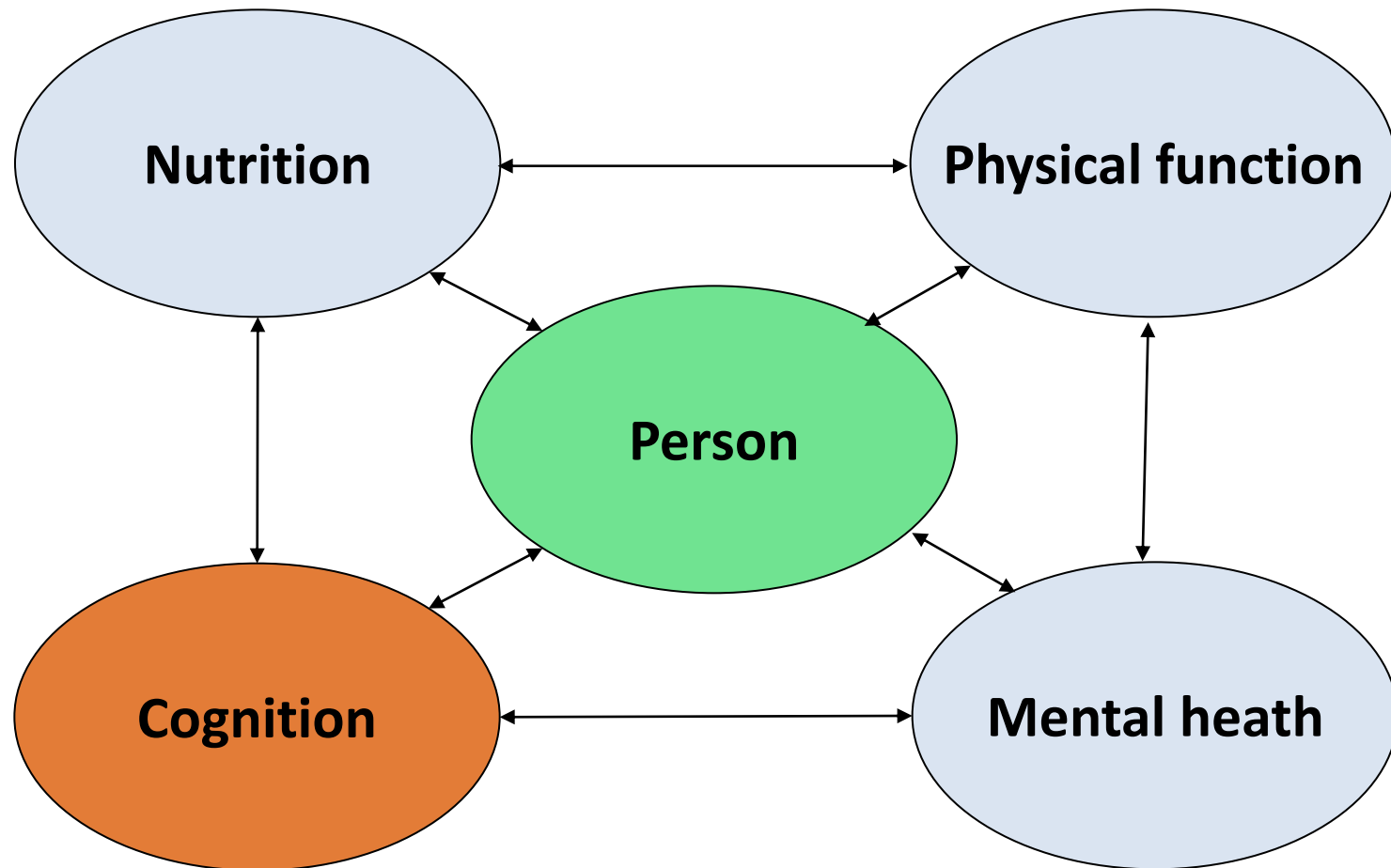
- 14 studies using technology aiming to:
- Improve data quality
- Reduce costs
- Reduce time
- Reduce respondent burden
- Facilitate longitudinal data collection
- Simplify self-monitoring (Ngo et al., 2009)



limitations

- Ease of use - familiarity with technology
- Micronutrient assessment inadequate
- Portion size estimation poor
- Balance participant and professional burden

- NANA aiming to address these issues by understanding where and why problems occur – for older adults and nutritionists





Naturalistic

cognitive assessment

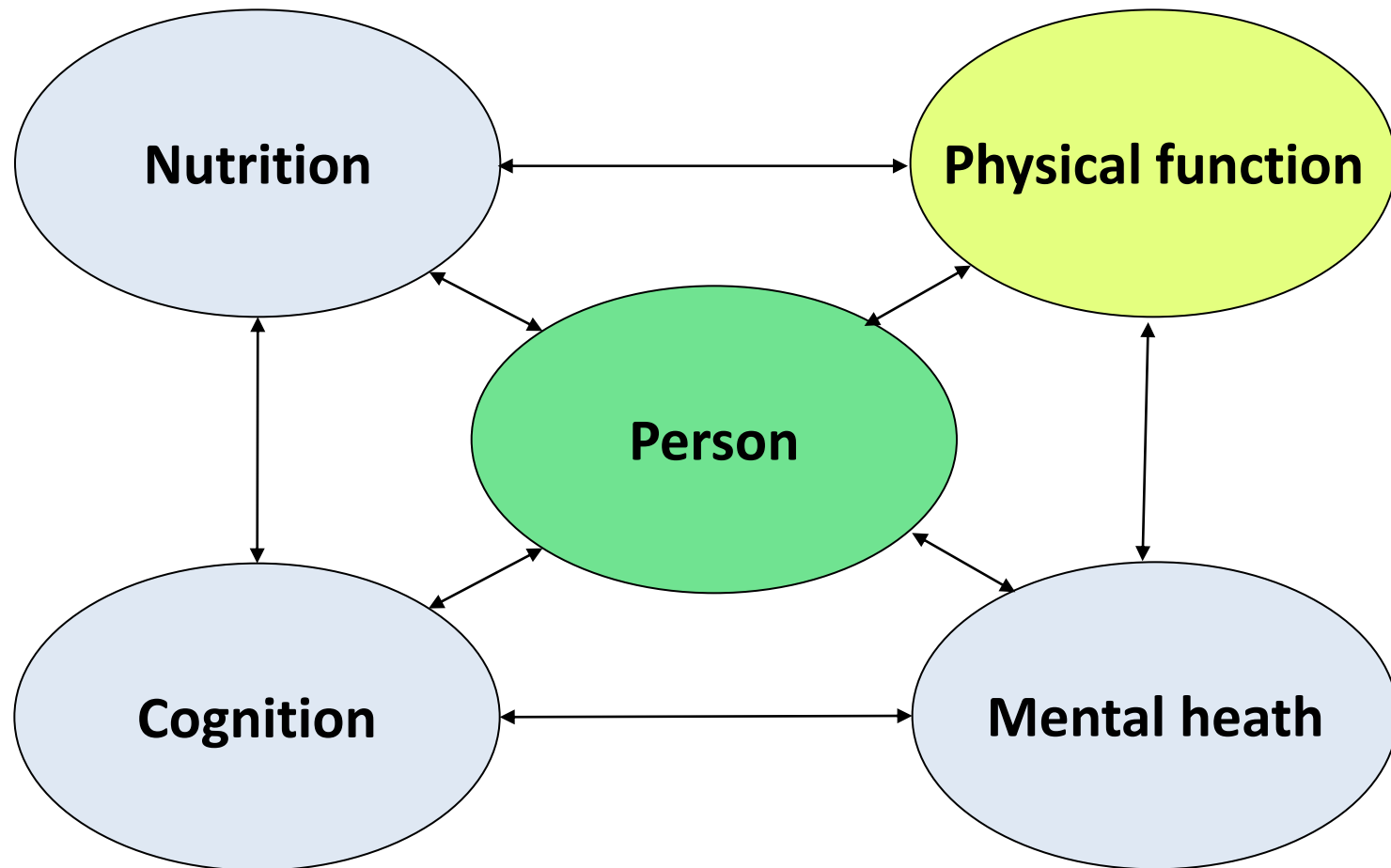
- Based around standardised measures but aiming for something unobtrusive
- Trying to develop measures that are:
- Sensitive to significant clinical change
- Acceptable for everyday use
- Engaging and rewarding for older people to want to use



Naturalistic

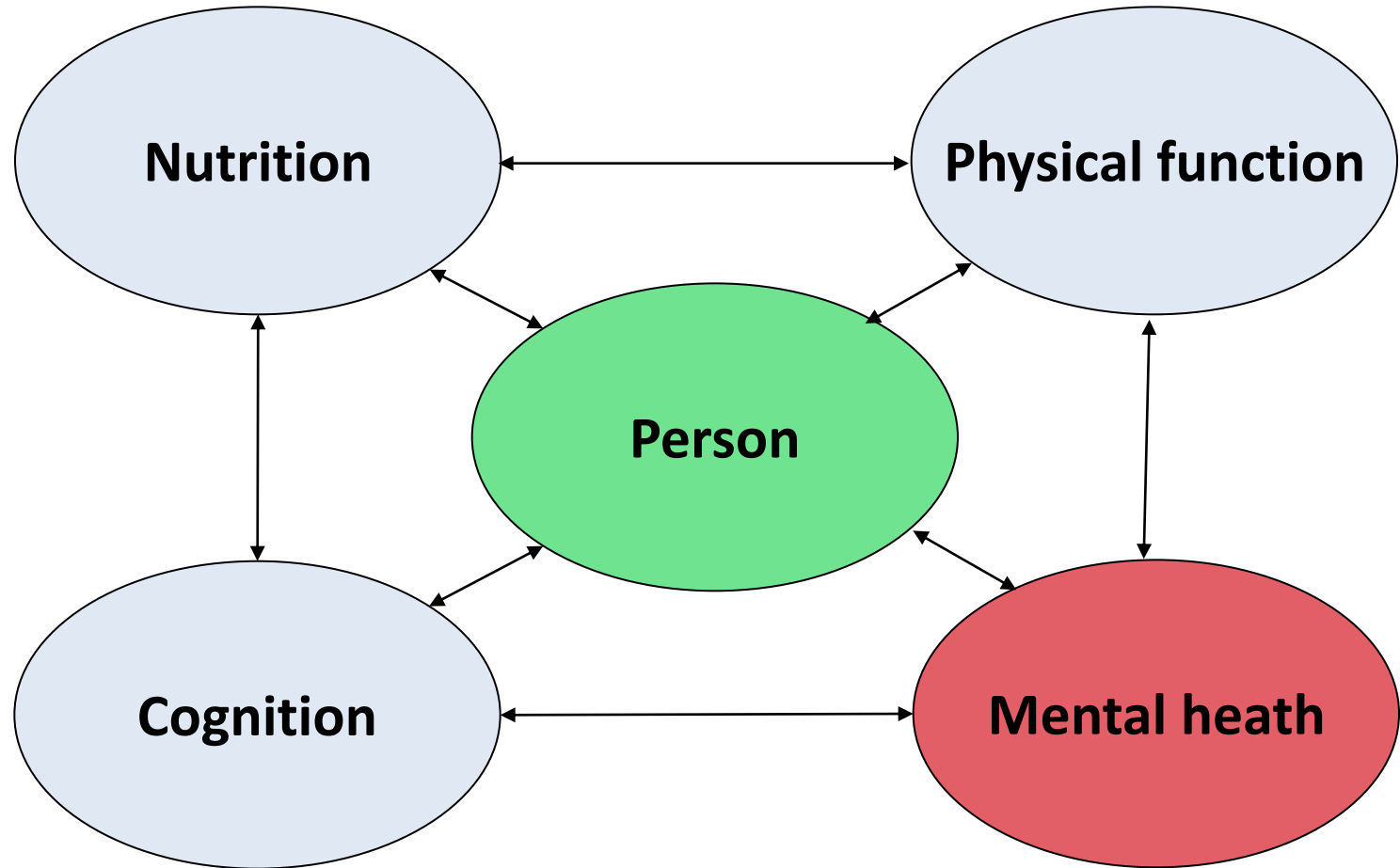
cognitive assessment

- Developed 10 new tests based on domains and mechanisms of existing tests
- 48 older adults aged 66 – 88years (mean 71.8)
- Completed three times over 1 week
- Compared with standardised test battery
- Randomised order of testing
- From this identified two tests for the final validation



Physical function

- Frailty phenotype (Fried et al., 2001):
- **Shrinking** – BMI<18 or 5% annual loss
- **Weakness** – grip strength
- **Poor endurance** – self-reported exhaustion
- **Slowness** – walking speed
- **Low activity** – k/cal per week
- NANA includes measures of all five



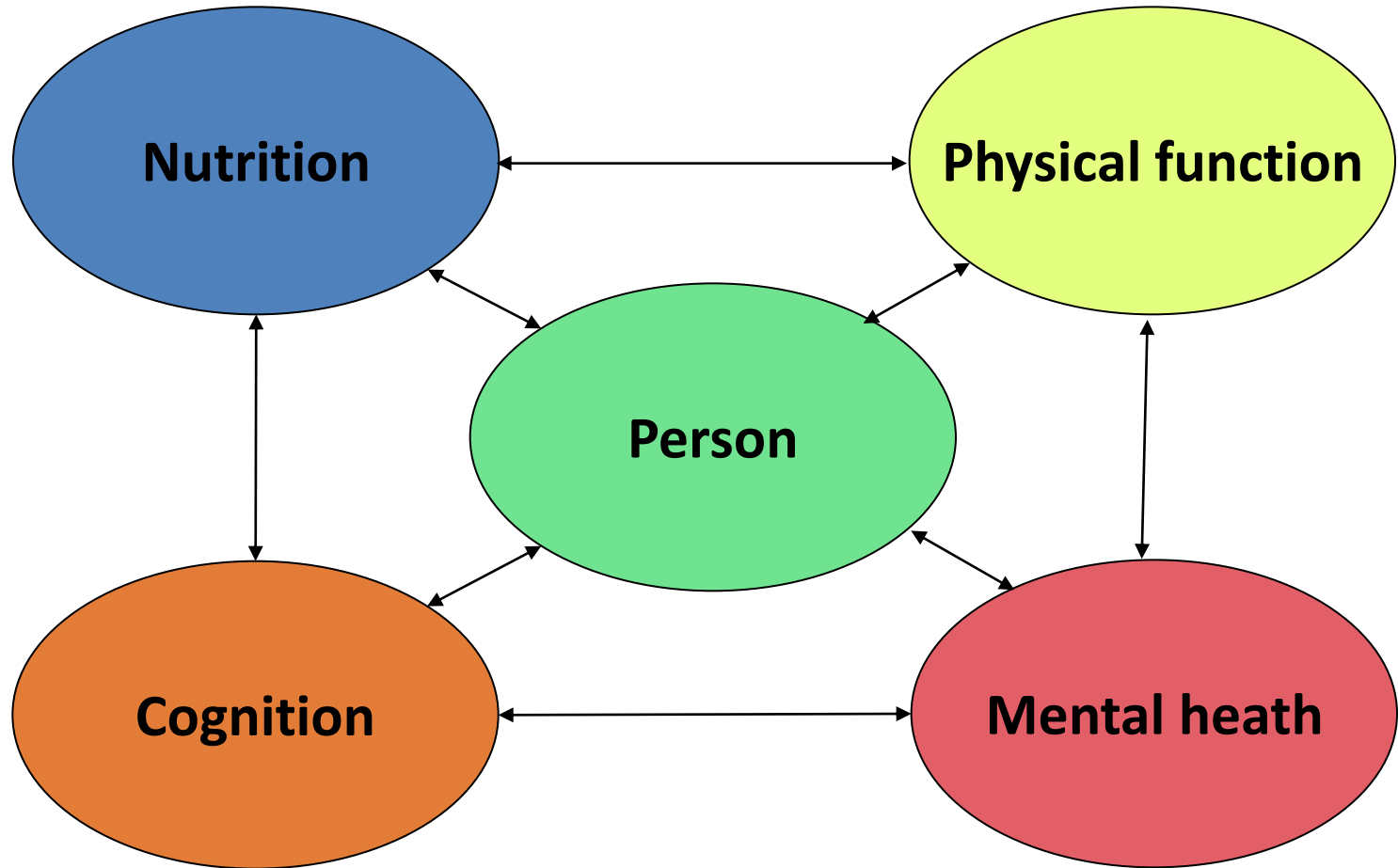
Diagnosis: DSM-IV criteria

Five (or more) of the following over two-weeks including (1) or (2):

- (1) Sad, depressed mood most of the day, nearly every day for two weeks
- (2) Loss of enjoyment of usual activities
- (3) **Significant change in weight or appetite**
- (4) Sleep disturbance
- (5) **Changed activity level - more or less active**
- (6) **Loss of energy, fatigue**
- (7) Lack of self-esteem, feelings of worthlessness and guilt
- (8) Problems concentrating or making decisions
- (9) Recurrent thoughts of death/suicide

Mental health assessment

- Current method = self-report
- E.g. BDI, HADS, GDS, MADRAS
- New method must be sensitive to significant change in mood - not diagnosis but enough to alert to need for investigation
- Developed and tested new approach alongside the new cognitive tests (n=48)





The plan

Phase 3: Full Validation of the Assessment Toolkit.

- Comparison of the new integrated assessment with traditional 'pen and paper' methods with volunteers having NANA in their homes



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Validation studies

- 100 participants aged 65-92 years (S & St.A)
- Comparison of NANA against traditional methods
- 1st validation – diet only = 40 participants
- 2nd validation – diet & cognition = 20 participants
- 3rd validation – diet, cognition, mood & physical function = 40 participants (4 months)
- Protocol includes clinic visit

Good agreement between new and traditional method of dietary assessment

	NANA: mean (sd)	Food Diary: mean (sd)
Energy (KJ)	7066.11 (1746.85)	7229.06 (1721.05)
Carbohydrate (g)	203.04 (61.34)	208.51 (62.64)
Protein (g)	62.37 (11.44)	68.65 (14.43)
Fat (g)	71.51 (17.73)	69.29 (18.63)
Saturated fat (g)	26.62 (8.19)	26.64 (9.42)
Riboflavin (mg)	1.70 (0.68)	1.65 (0.50)
Vitamin B12 (µg)	6.33 (6.63)	5.48 (4.44)
Folate (µg)	257.5 (84.19)	267.44 (69.76)
Vitamin C (mg)	103.31 (47.89)	146.69 (92.36)
Vitamin D (µg)	2.41 (0.96)	3.35 (3.80)
Iron (mg)	11.49 (2.73)	11.89 (3.21)
Retinol (µg)	1182.5 (1542.03)	339.33 (134.97)
β-carotene (µg)	4015.5 (2706.01)	4863.39 (2583.64)

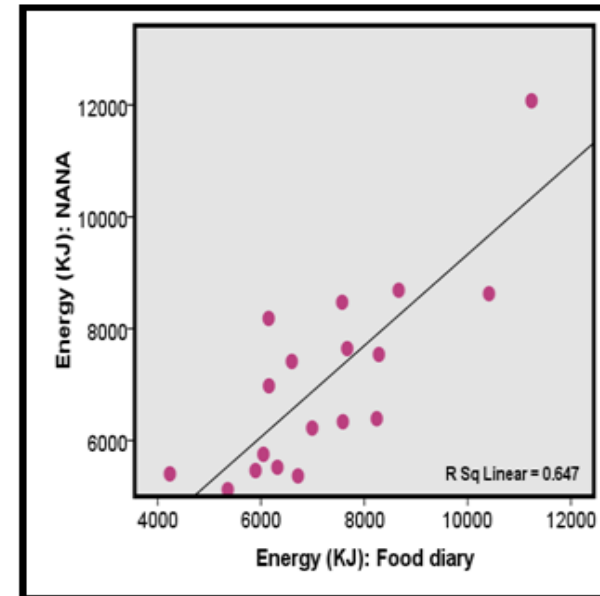


Figure 4.2 Scatterplot for total energy intake as recorded by the estimated food diary and NANA method

Next steps

- Complete analysis
- Integrate all data
- Apply to a larger scale population

Ultimate goal

- Development of a single integrated toolkit for the assessment of dietary intake, cognition, mood & physical function for use by researchers and health care professionals





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The NANA team



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