Psychology 360: Personality Research: Other areas

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Outline

Other domains of personality research

1. Predicting success: Some classic studies
2. Evolutionary perspectives and individual differences
3. Behavior Genetics of Personality
4. Personality and Intelligence
5. Longitudinal studies of personality consistency
   - Block et al.
   - Caspi et al.
6. Cognitive Affective Personality Systems
7. Affective Dynamics

Classics in Prediction and selection

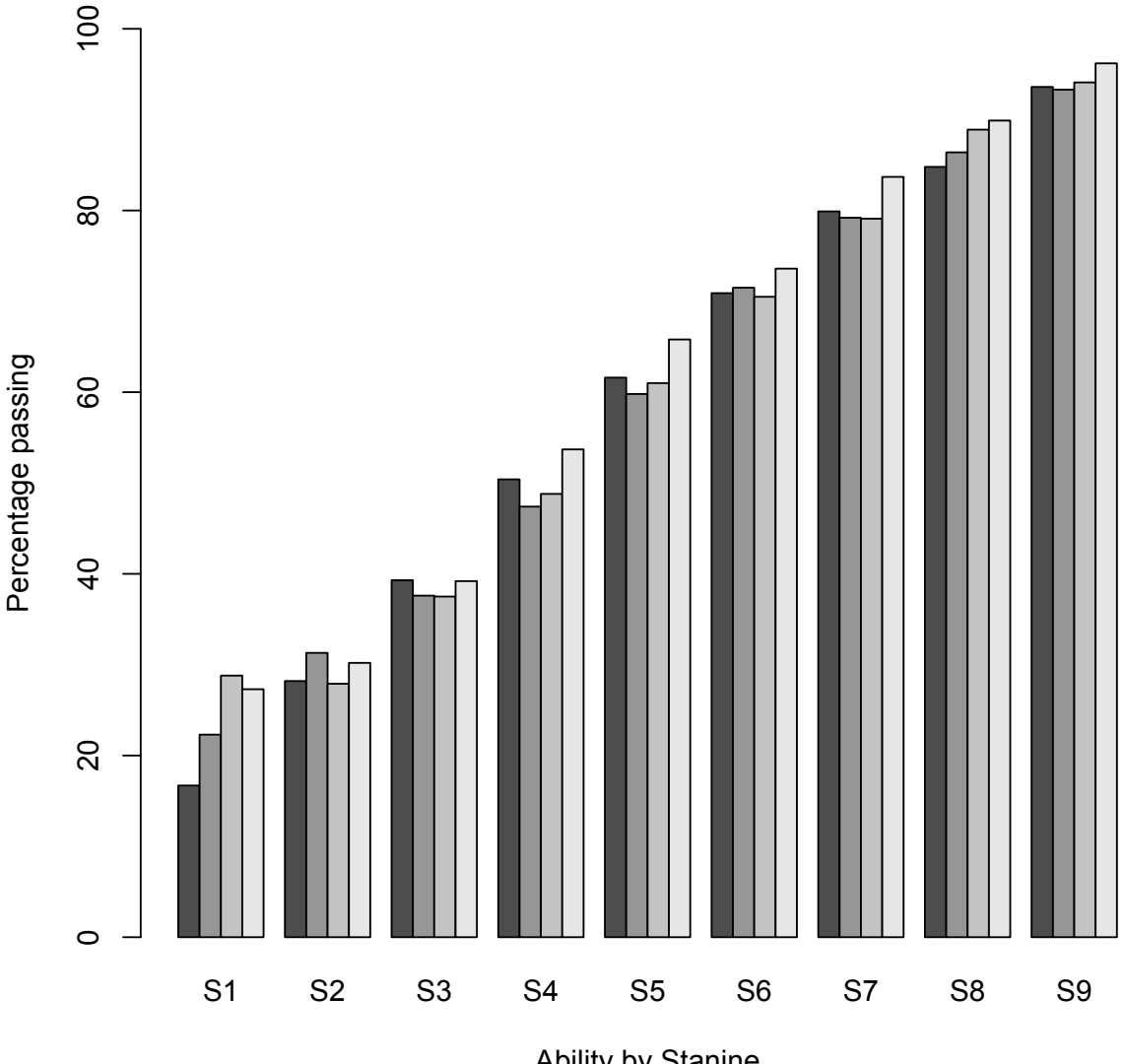
1. Gideon's selection of soldiers
2. OSS and Army Air Corps selection studies
3. Kelly & Fiske (1950) (1950) selection of psychology students (Kelly & Fiske, 1951)
4. Astronaut selection
5. Peace Corps selection

Personality, ability and prediction

1. Much of the science of prediction was due to the need to select troops for the military and subsequently clinical psychologists for the VA
2. In the First World War, this led to the development of the Army Alpha, the first group administered ability test Yerkes (1918); Yoakum & Yerkes (1920)
3. In the Second World War, there was a need to select pilot trainees (Dubois, 1947) and spies (OSS Assessment Staff, 1948).
4. Following WWII, there was a great need to select potential students for clinical psychology training (Kelly & Fiske, 1950, 1951)

Earliest military assessment: Gideon

The assessment of pilots – a .45 correlation makes a difference (Dubois, 1947)



OSS selection: The more you 'know', the less well you do

1. Office of Strategic Services (became the CIA) needed to assess potential spies
2. The problem was, what makes good spy
3. The Army Airforce project (Dubois, 1947) used basic psychometrics, the OSS selection (OSS Assessment Staff, 1948) used mainstream personality researchers
4. OSS held "house parties" where candidates were given false identities and had to play act for several days.
5. Criterion validity was a serious problem

Predicting clinical psychologists – Kelly and Fiske

1. Following WWII, there was a great need for clinical psychologists to give treatment in the VA
2. The need to select clinical psychology applicants for graduate training.
3. Multiple predictors of graduate school performance: Kelly and Fiske (1950), Multiple predictors
4. Ability, Interests, temperament (each with r $\approx$ .2 -.25) have multiple R of .4-.5
5. Are they able, interested and stable?

VA study: overview

- Researchers
  - nearly 40 cooperating clinical training programs
  - $\approx$ 75 psychologists on research staff
- Participants
  - 3/4 of those entering graduate training in 1946, 1947, 1948
  - N = 160, 128, 545 (selected down to 98)
- Measures
  - Objective tests
  - Clinical assessments

Objective instruments

- Ability
  - Millers Analogy Test
  - Thurstone Tests of Primary Mental Abilities
- Temperament and Character
  - Minnesota Multiphasic Personality Inventory
  - Guildord Martin Battery of Personality Inventories
- Interests, Values
  - Allport-Vernon Scale of Values
  - Strong Vocational Interest Blank
  - Kuder Preference Record

Assessment ratings

- Seven days of tests, interviews and "other" procedures
  - Three raters spent a week studying 4 trainees
  - Staff time devoted to each candidate was at least 7 man-days
- Ratings based on interviews, projective tests, role playing
  - Ratings on:
    - 22 descriptive variables (e.g., cooperativeness, talkativeness)
    - 10 evaluative variabels (e.g., social adjustment, emotional expression)
    - 11 predictive variables (e.g. academic, diagnostician, overall suitability)

Criterion variables after 2 years

- Training status (Failure, still in Training, Ph.D. obtained)
- 2nd year evaluations
  - Skill in clinical diagnosis
  - Skill in individual psychotherapy
  - Skill in Research
  - Preference for hiring
- Generally high correlations among all the criteria

High correlations among the criteria

Intercorrelations among selected criterion evaluations

N = 130 P-3 trainees evaluated in the spring of 1949, for whom all evaluation measures were available.

		Clinical Diagnosis		Individual Therapy		Research		Preference for Hiring	
		Univ.[1]	Instal.[2]	Univ.	Instal.	Univ.	Instal.	Univ.	Instal.
Clinical Diagnosis:	Univ.	*72*	47	81		55		88	
	Instal.		*79*		60		54		65
Individual Therapy:	Univ.		38	*73*	63	48		78	
	Instal.	62			*86*		37		74
Research:	Univ.		28		31	*65*	54	76	
	Instal.	11		30			*85*		56
Preference for Hiring:	Univ.		34		70		31	*71*	56
	Instal.	44		38		40			*85*

[1] University staff evaluations.
[2] Installation staff evaluations.

The more they know about you, the more they will judge you

Assessor	Information on Which Predictions Were Based										Criterion Evaluations							
	Rorschach	TAT	Sentence Compl.	Bender-Gestalt	Credentials	Objective Tests	Autobiographical Materials	Interview	Situations	Other	Clinical Diagnosis		Individual Therapy		Research		Preference for Hiring	
											Univ.	Instal.	Univ.	Instal.	Univ.	Instal.	Univ.	Instal.
A. Assessment Ratings																		
Projectivist	X										02	08	07	01	17	22	24*	13
		X									17	18	17	17	−06	−07	17	16
			X								18	32**	04	15	25*	25*	12	20
				X							−01	−03	−05	00	00	06	−01	11
Proj. Integration	X	X	X	X							−05	−02	−11	01	12	03	08	18
Initial					X						13	10	22	25*	14	21	09	25*
Interviewer					X			X			21	04	22	16	13	20	09	14
Intensive					X						16	07	16	14	24*	15	20	20
Interviewer					X	X					36**	22	26*	19	32**	22	34**	28*
					X	X	X				19	08	20	16	35**	24*	30**	23*
	X	X	X	X	X	X	X				24*	21	27*	22	40**	33**	33**	33**
	X	X	X	X	X	X	X	X			24*	24*	30**	22	28*	22	31**	33**
Pre-Conference	X	X	X	X	X	X	X				38*	29	32*	19	44**	27	48**	37*
Situationists (Pooled Rating)									X		30**	28*	23*	25*	31**	22	18	36**
Prelim. Pooled	X	X	X	X	X	X	X	X			22	13	26*	22	21	24*	29*	35**
Final Pooled	X	X	X	X	X	X	X	X	X	X	23*	11	30**	18	12	14	21	21

Objectives are just as good

B. Objective Test Scores

Miller Analogies	24*	15	06	05	24*	23*	23*	18
Strong Test								
Psychologist—1938	29*	14	20	21	35**	31**	27*	19
Psychologist—1948 (Kriedt)	36**	20	28*	21	41**	32**	31**	20
Psychologist, Clinical, 1948 (Kriedt)	22	30**	18	16	07	07	17	09
Psychologist, VA Clinical (This Project)	36**	33**	35**	32**	33**	27*	36**	25*
Allport-Vernon Theoretical	23*	−03	16	04	25*	15	23*	−02
Guilford-Martin								
C—Lack of Cycloid Disposition	29*	24*	29*	17	19	11	28*	16
N—Lack of Nervous Tenseness and Irritability	28*	23*	21	24*	21	06	22	20

Interviews might actually hurt!

The finding that the interview did not add to, but actually tended to decrease, the validity of clinical judgments made in the 1947 assessment program was confirmed by submitting the paper and-pencil materials on these same candidates to a later assessment staff which made predictions without any face-to-face contact with the assessee. Under these conditions, the new staff made predictions with slightly higher validities than those made by the staff in 1947, who had the additional data from the interview, situation tests, etc.

Interests matter

The VA Clinical Psychologist key, developed by this project on the basis of the responses of full time VA psychologists, regularly yields relatively high correlations with all criterion evaluations, and compares favorably with the best predictions based on assessment ratings. Other psychologist keys, including the original (1938) general psychologist key and two developed by Kriedt (2), do fairly well. Not shown in the table is a correlation of .61 (N = 44) between scores based on the psychologist key (1938) and the scores made on the objective test of Knowledge of Clinical Psychology three years later. Thus, scores from a single objective test obtainable by mail, at little cost, predicted each of several criteria as well as any of the clinical judgments made in the entire assessment program

Motivation

Our findings suggest that, in selection for professional training, more attention might well be given to the role of motivation, Perhaps at the level of graduate training, we need establish only a minimal cutting score on tests of intellectual aptitudes; beyond that point, the strength of motivation and the absence of conflicting drives may be the determining factors in success in professional training, and even in the conduct of professional duties.

Faith validity of interviews

Many who have seen our results have been disturbed by the findings regarding the validity for this selection problem of specific techniques which are felt by many professional psychologists to have a high degree of face-validity (or is it faith validity?). Thus, it was the firm conviction of the staff of the OSS assessment program that the global evaluation of a person permits much more accurate predictions of his future performance than can possibly be achieved by a more segmental approach. Unfortunately, the OSS data did not provide a conclusive answer to this question. Our own findings to date serve to raise doubts concerning the validity of this general proposition.

We must evaluate our judgments

Evidence such as that accumulating in this project serves to remind us of the fallibility of the human being both as a measuring device and as an integrator of data. In laboratories, in factories, and in accounting offices, it has been found necessary to supplement his sensory and perceptual capacities with an elaborate array of measuring instruments and computing devices. Pending the gradual development of better measures of psychological variables and comparable aids for combining them, we must continue to rely heavily on human judgment. In so doing, however, we must be continually aware of the magnitude of the errors of such judgments. These errors can be minimized by placing greatest reliance on measures of demonstrated reliability and validity.

Putting it together

We are, in fact, rather encouraged at the probability of being able to predict such criteria with a multiple R of around .50 on the basis of an inexpensive test battery which may be administered without requiring the applicant to present himself at the university of his choice.

More recent prediction studies

1. Terman & Oden (1947, 1959); Oden (1968)
2. Kuncel, Campbell & Ones (1998); Kuncel, Hezlett & Ones (2001); Kuncel & Hezlett (2007) and graduate school prediction
3. Benbow, Lubinski & Stanley (1996); Lubinski & Benbow (2000); Lubinski, Webb, Morelock & Benbow (2001); Lubinski & Benbow (2006); Lubinski (2016)
4. Deary, Whiteman, Starr, Whalley & Fox (2004); Deary & Batty (2007); Deary, Strand, Smith & Fernandes (2007); Deary, Pattie & Starr (2013)

Kuncel et al. meta analysis predicting graduate school performance

Table 2
Meta-Analysis of GRE and UGPA Validities: Total Sample

Predictor	N	k	r_{obs}	SD_{obs}	SD_{res}	ρ	SD_ρ	90% credibility interval
GGPA								
Verbal	14,156	103	.23	.14	.10	**.34**	.15	.09 to .59
Quantitative	14,425	103	.21	.11	.06	**.32**	.08	.19 to .45
Analytical	1,928	20	.24	.12	.04	**.36**	.06	.26 to .46
Subject	2,413	22	.31	.12	.05	**.41**	.07	.30 to .52
UGPA[a]	9,748	58	.28	.13	.10	**.30**	.11	.12 to .48
1st-year GGPA								
Verbal	45,615	1,231	.24	.19	.09	**.34**	.12	.14 to .54
Quantitative	45,618	1,231	.24	.19	.08	**.38**	.12	.18 to .58
Analytical	36,325	1,080	.24	.19	.06	**.36**	.09	.21 to .51
Subject	10,225	98	.34	.11	.03	**.45**	.04	.38 to .52
UGPA[a]	42,193	1,178	.30	.18	.10	**.33**	.10	.17 to .49
Comprehensive exam scores[b]								
Verbal[c]	1,198	11	.34	.16	.12	**.44**	.15	.19 to .69
Quantitative[c]	1,194	11	.19	.11	.04	**.26**	.06	.16 to .36
Subject[d]	534	4	.43	.07	.00	**.51**	.00	.51 to .51
UGPA[a]	592	6	.12	.05	.00	**.12**	.00	.12 to .12
Faculty ratings								
Verbal	4,766	35	.23	.12	.08	**.42**	.14	.19 to .65
Quantitative	5,112	34	.25	.10	.02	**.47**	.04	.40 to .54
Analytical	1,982	9	.23	.05	.00	**.35**	.00	.35 to .35
Subject	879	12	.30	.16	.11	**.50**	.18	.20 to .80
UGPA[a]	3,695	22	.25	.12	.10	**.35**	.14	.12 to .58
Degree attainment[a]								
Verbal	6,304	32	.14	.14	.12	**.18**	.16	−.08 to .44
Quantitative	6,304	32	.14	.17	.15	**.20**	.20	−.13 to .53
Analytical	1,233	16	.08	.25	.22	**.11**	.30	−.38 to .60
Subject	2,575	11	.32	.16	.14	**.39**	.17	.11 to .67
UGPA[a]	6,315	33	.12	.17	.16	**.12**	.16	−.14 to .38

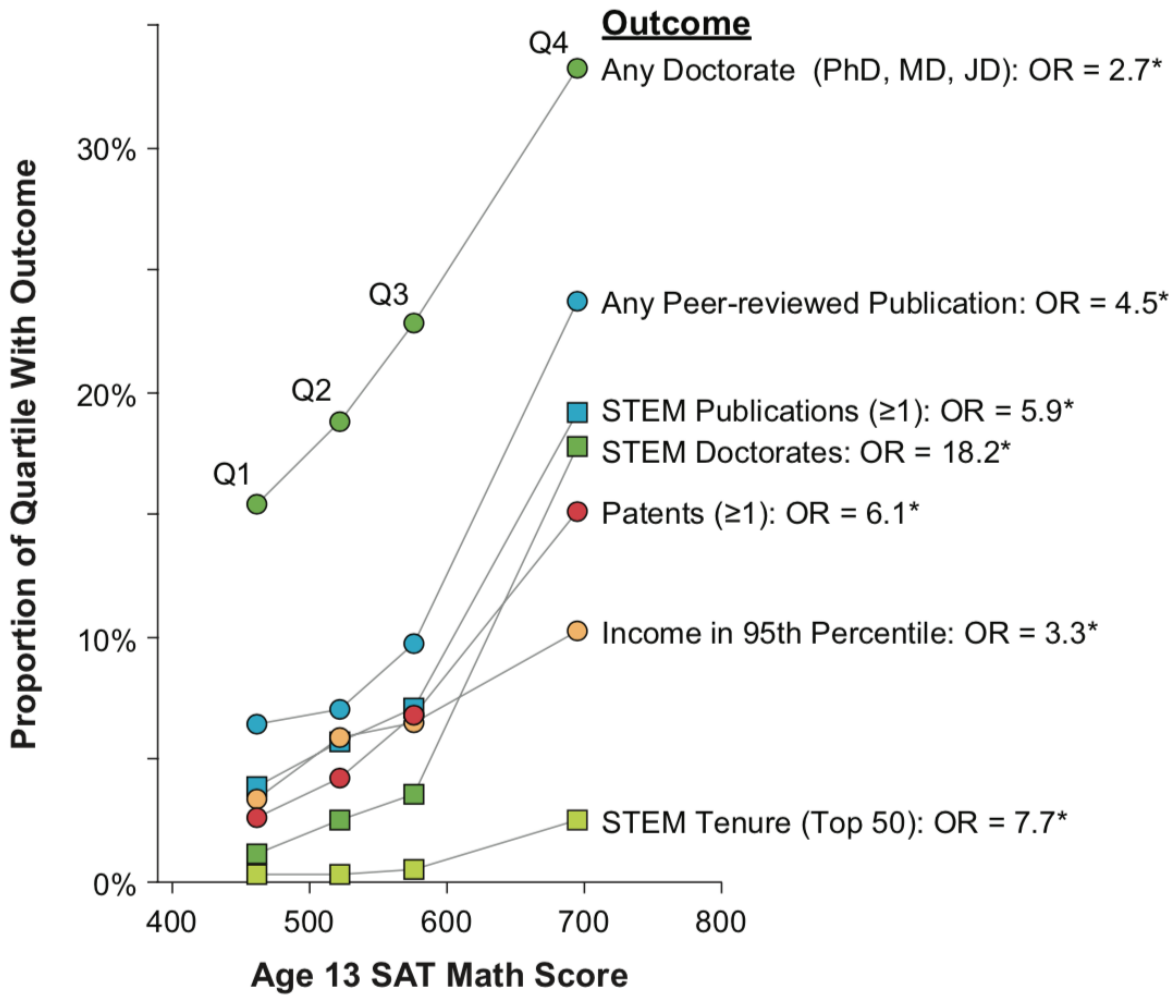
Kuncel et al. meta analysis predicting graduate school performance

Table 9
GRE and UGPA Unit-Weighted Composite Predicting GGPA and Faculty Ratings

Predictor set	Predictive validity of unit-weighted composite	Predictive validity of composite plus UGPA (unit weighted)
Verbal	.41	.48
Quantitative	.42	.50
Analytical	.38	.46
Subject	.49	.54
Verbal + Quantitative	.46	.53
Verbal + Quantitative + Analytical	.45	.50
Verbal + Quantitative + Subject	.52	.56
Verbal + Quantitative + Analytical + Subject	.50	.54

Note. GRE = Graduate Record Examinations; UGPA = undergraduate grade point average; GGPA = graduate grade point average.

Benbow and Lubinski: Beyond the threshold



Deary: the Scottish sample and test retest relability

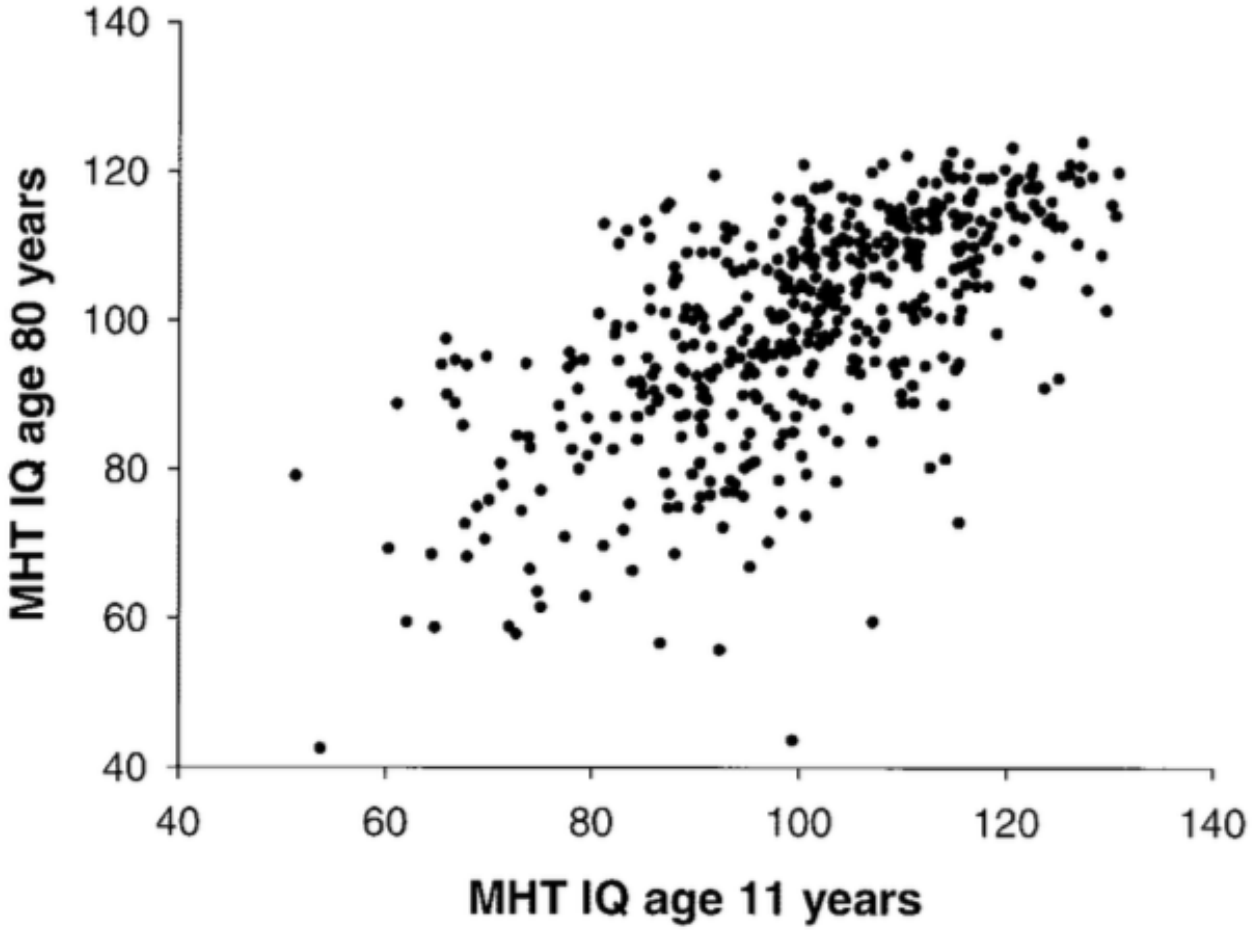
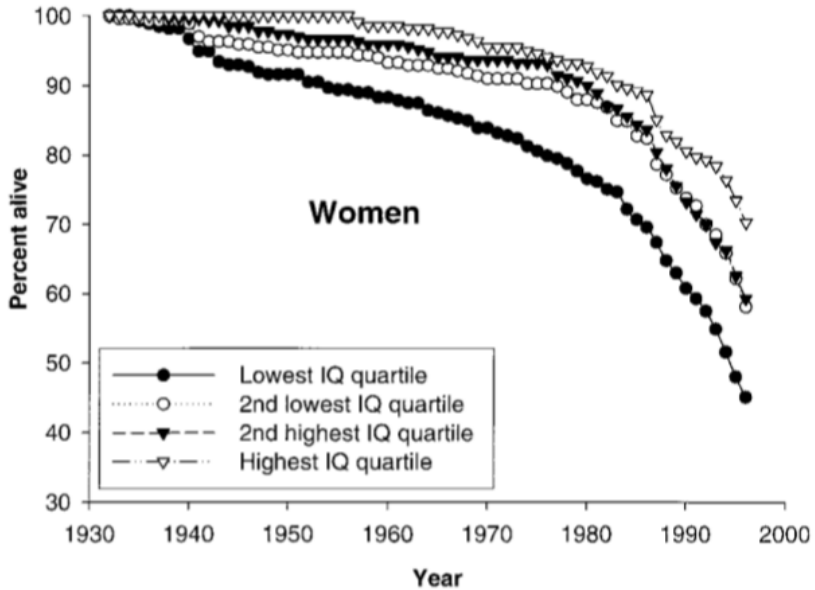
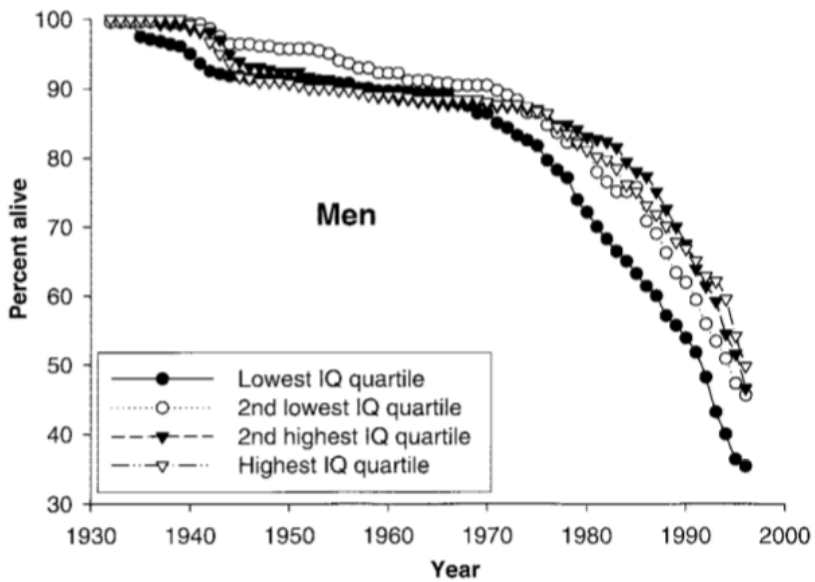


Figure 3. Scattergram of age-corrected Moray House Test (MHT) scores at age 11 and age 80 for participants in the Lothian Birth Cohort 1921 of the Scottish Mental Survey 1932.

Deary: the Scottish sample and mortality





Deary: the Scottish sample and mortality: a model

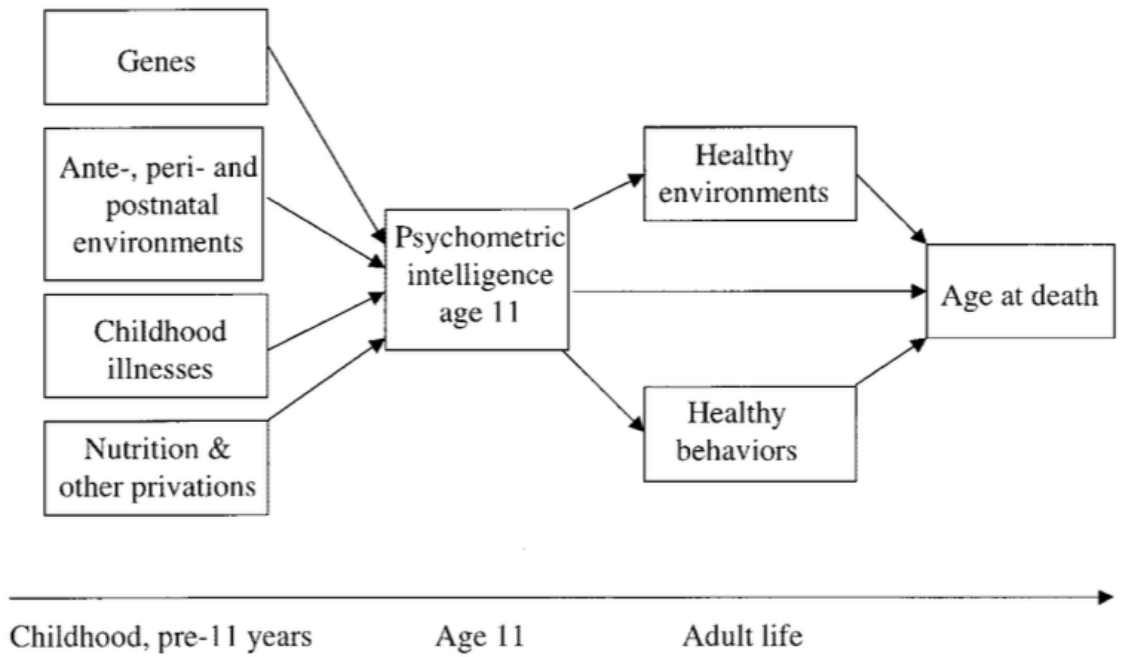


Figure 6. Some possible influences and pathways linking mental ability in childhood and survival. From *Brain and Longevity: Perspectives in Longevity* (p. 162, Figure 3), by C. Finch, J.-M. Robine, & Y. Christen (Eds.), 2003, Berlin: Springer. Copyright 2003 by Springer. Adapted with permission.

The persistent myth of the validity of the interview

1. It has been known since 1950 Kelly & Fiske (1950) that interviews are appealing but do not work.
2. Everyone relies on their feeling that they work, remembering successes, forgetting failures.
3. Clinical versus actuarial prediction Dawes, Faust & Meehl (1989)
4. Experience is not a good teacher when the feedback is slow Dawes (1989)
5. Belief in the unstructured interview Dana, Dawes & Peterson (2013)
6. Summarized very well in Dawes (2009)

Medical School Admissions

1. As discussed by Dawes (2009), DeVaul, Jervey, Chappell, Caver, Short & O'Keefe (1987) examined the effect of interview ratings on later success in medical school.
2. Of 2200 applicants to medical school, 800 were invited to interview and were interviewed
3. Of these, 150 of the top 350 were offered positions
4. The state then provided funding for an additional 50 students
5. only the 700-800 ranked students were still available
6. After four years: "Even when the top 50 students in committee preference were compared with the 50 applicants, there were no differences. Thus, the least desirable candidates performed as well as the most desirable.

What predicts success in advanced training: dispelling some myths

1. Myth: Tests only predict first-year grades
2. Myth: Tests are not related to success in the Real World
3. Myth: Beyond a certain point, higher scores don't matter
4. Myth: Common Alternatives to tests are more useful
5. Myth: Tests are just measures of social class
6. Myth: Test prep and coaching produce large score gains
7. Myth: Tests prevent diversity in admissions

(Sackett & Kuncel, 2018) See also Wall Street Journal opinion piece by Kuncel and Sackett

Should we use the GRE/GMAT for admission

1. Woo, LeBreton, Keith & Tay (2021) addresses the question of bias, fairness and validity in graduate admissions.
   - Grade Point Average
   - Personal Statements
   - Resumes/CVs
   - Letters of recommendation
   - Interview
   - GREs
2. De Los Reyes & Uddin (2021) suggests that is the wrong question.
   - Need for holistic assessment
   - Predicting academic success is wrong unless we change what it means to be a successful academic

Personality, Individual Differences and Evolutionary Psychology

1. Evolutionary Psychological Theory
2. Tooby & Cosmides (1990) The Adapted Mind Barkow, Cosmides & Tooby (1992)
   - Species typical behavior
   - Adaptations that are important for survival and reproduction will be selected for over time
3. Why are there individual differences: the example of extraversion

   Nettle (2005, 2006)

Five broad classes of competition

1. Between Species
2. Within Species
   - Intrasexual competition for survival and reproduction
   - Intersexual competition
   - Parent-offspring competition
   - Sibling competion

Competition 1: Between species

1. Competition and co-evolution: the "Red Queen hypothesis" (Van Valen, 1977)
   need to run fast just to stay in place
2. Is co-evolution the genesis of sexual reproduction?
   Why do we sexually reproduce – wastes 50% of our genes
   Random reassortment protects from parasites?
3. Are individual differences merely a defense against parasitic load?

Competition-2: Within Species

Intra-sexual competition for survival and reproduction

1. – Niche selection
2. Multiple strategies lead to locally optimal solutions
3. (Nettle, 2005, 2006) discusses costs and benefits that lead to balanced selection

   Extraversion leads to higher reproduction but at cost of increased mortality risk

Competition 2: Within species

Inter-sexual competition

1. Resource investment model (Buss, 1991, 1995; Buss & Schmitt, 1993, e.g.,)
   Materity certainty and high resource cost
   Paternity uncertainty and low resource cost
2. But reproductive success is not number of children, but number of surviving descendants

Competition 4: Within Species

Parent - offspring competition for resources

1. Offspring share 50% of parent's genes.
2. Reproductive value of offspring to parent varies as situational stress and probability of offspring reproduction
3. Parent - step child conflict - Cinderella (Daly & Wilson, 1994)

Competition -5: within species

Sibling competition

1. See "Born to rebel" (Sulloway, 1997) for a discussion of the implication of birth order effects
2. Differential reproductive fitness (as a child) as a function of birth order leads to
   - Multiple strategies varying by birth order
   - First borns – higher conscientiousness
   - Later borns higher openness
3. But see also (Harris, 2011) for the importance of peer groups
   - Peer groups as a collection of unexplained variance
4. (Damian & Roberts, 2015b,a) for a failure to find birth order effects

A general motivational model by Del Giudice (2023)

(From the abstract)

1. To achieve integration in the study of personality, researchers need to model the motivational processes that give rise to stable individual differences in behavior, cognition, and emotion.
2. The missing link in current approaches is a motivational architecture—a description of the core set of mechanisms that underlie motivation, plus a functional account of their operating logic and inter- relations.
3. This paper presents the initial version of such an architecture, the General Architecture of Motivation (GAM).
4. The GAM offers a common language for individual differences in humans and other animals, and a conceptual toolkit for building species-specific models of personality.
5. The paper describes the main components of the GAM and their interplay, and examines the contribution of these components to the emergence of individual differences.
6. The final section discusses how the GAM can be used to construct explicit functional models of personality, and presents a roadmap for future research.

Five adaptive problems (Del Giudice, 2023)

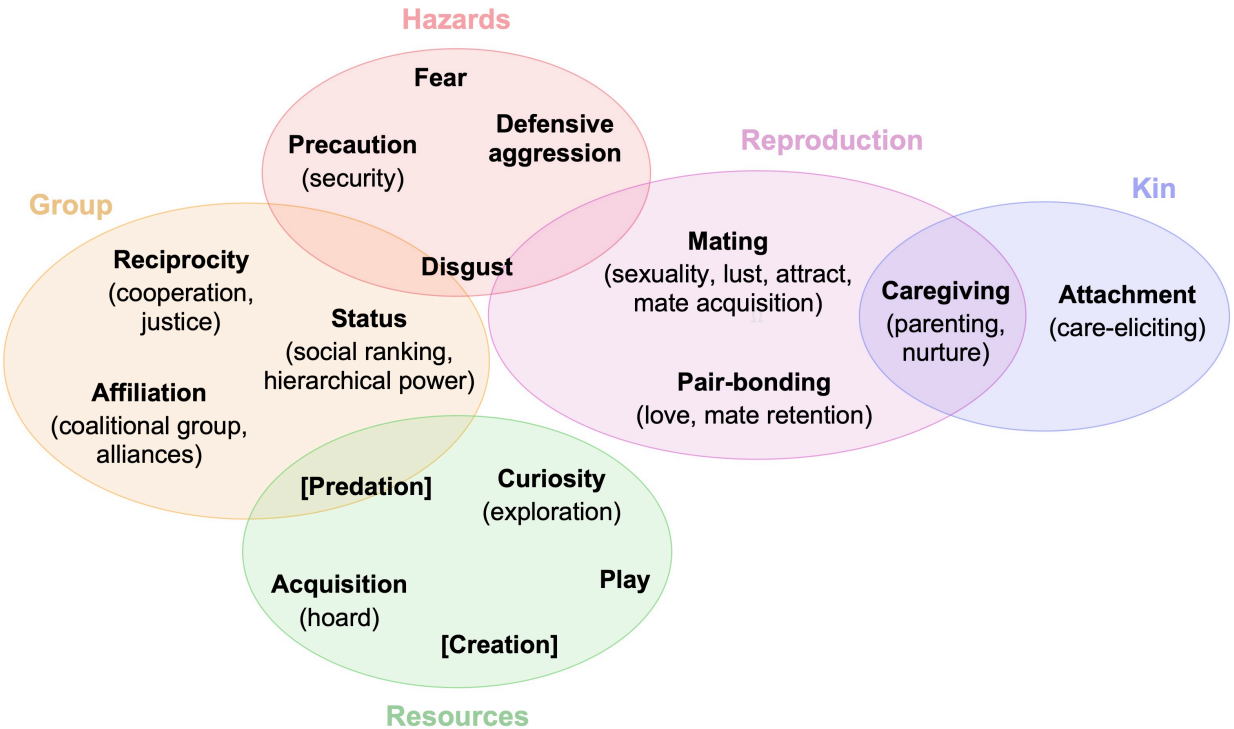


Figure 3. A partial map of human motivational systems, grouped into five broad categories of adaptive problems. Some alternative labels used in the literature are shown in parentheses. The systems in square brackets are still mostly hypothetical but warrant further investigation. Note that the map does not include basic physiological needs such as hunger/thirst, evacuation, or thermoregulation. Modified with permission from Del Giudice (2022).

The General Architecture of Motivation (Del Giudice, 2023)

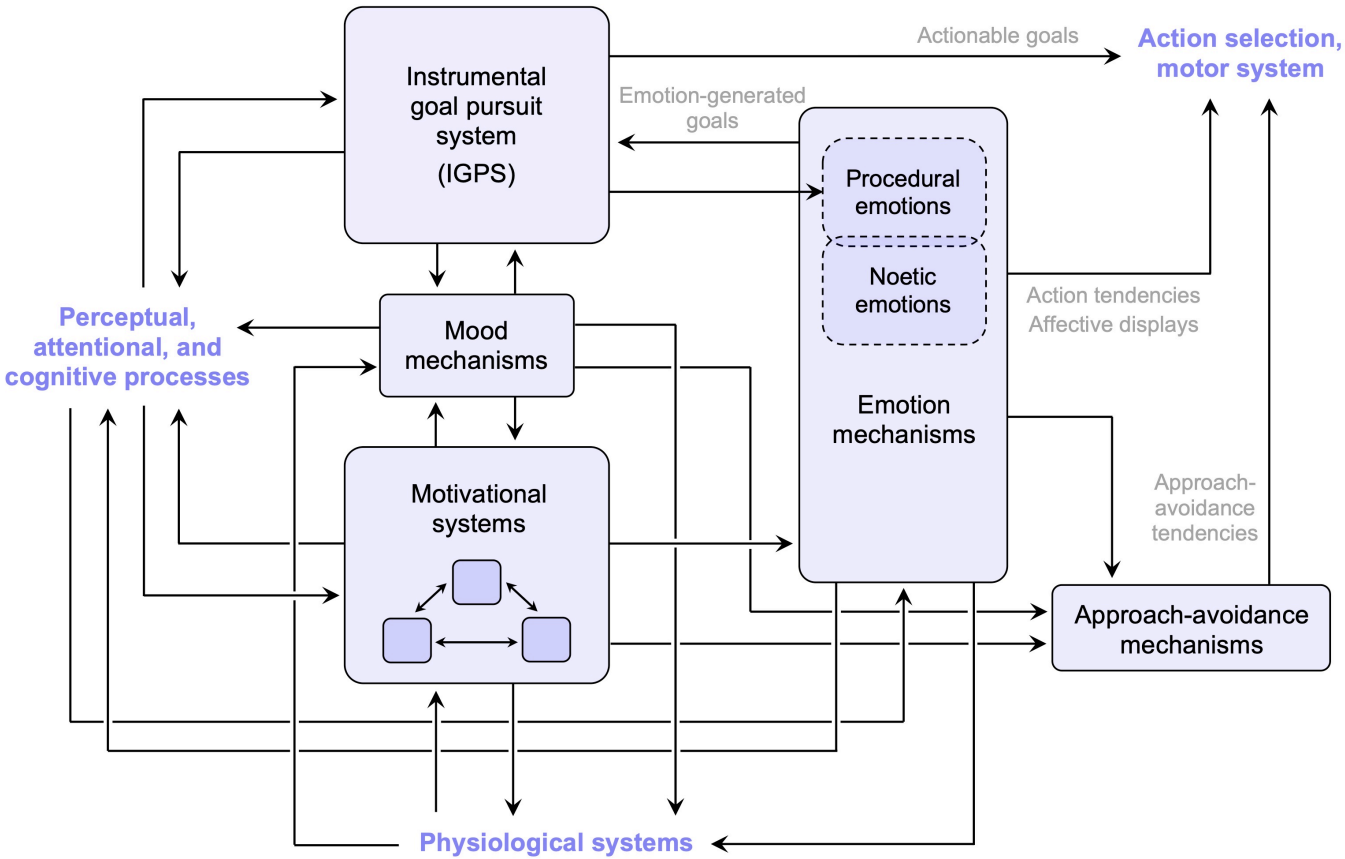


Figure 1. Schematic diagram of the General Architecture of Motivation (GAM).

The Coordination System (Del Giudice, 2023)

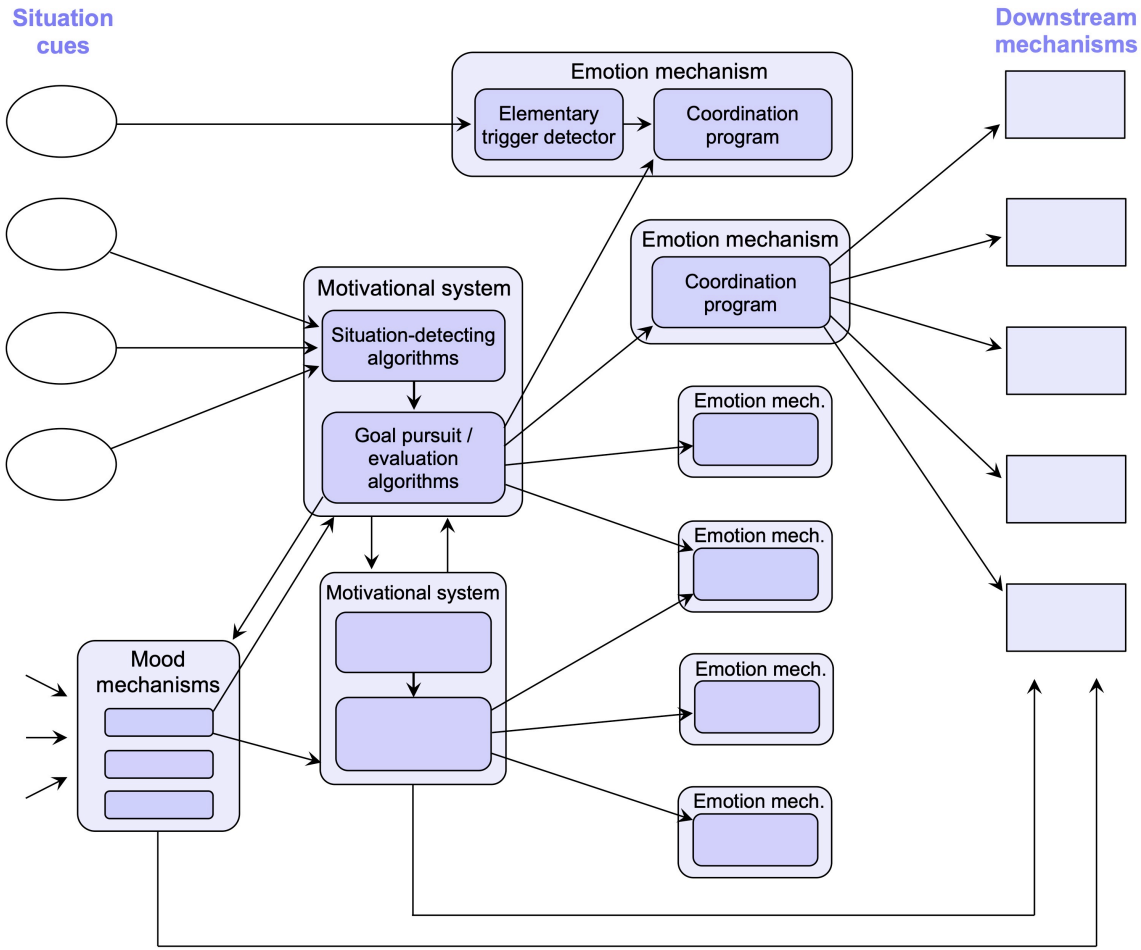
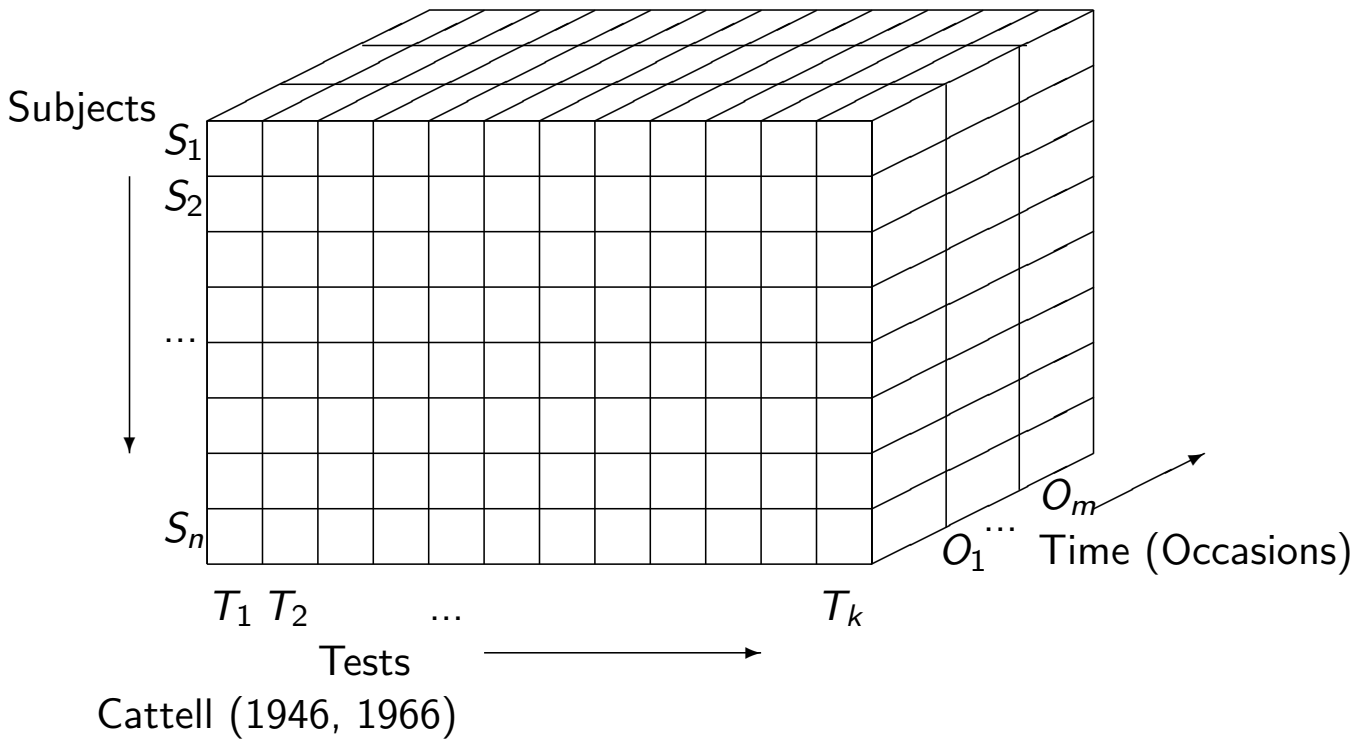


Figure 2. Schematic diagram of the extended coordination approach. Modified with permission from Del Giudice (2022). For visual clarity, the arrows pointing to the downstream mechanisms on the right are shown only for one of the emotion mechanisms. Also, it is implied that the activity of downstream mechanisms will usually affect the current situation, thus feeding back to the situational cues on the left.

The Cattell data box and six ways to analyze personality



Cattell (1946, 1966)

Cattell and the Data Box

1. One occasion
   - R: Correlate measures across persons : standard personality traits
   - Q: Correlate Persons acros measures: Personality typology
2. One Person
   - P: Correlate Measures across Occasions; Individual personality structure
   - O: Correlate Occasions across measures: Individual psychological environment
3. One Measure
   - T: Correlate Occasions across Persons: Anxiety arousing situations
   - S: Correlate Persons across Occasions: Anxious person types

Cattell (1946, 1966b,a); Revelle (2009, 2015) (Note that Cattell changed his notation from paper to paper).

The Psychological Spectrum

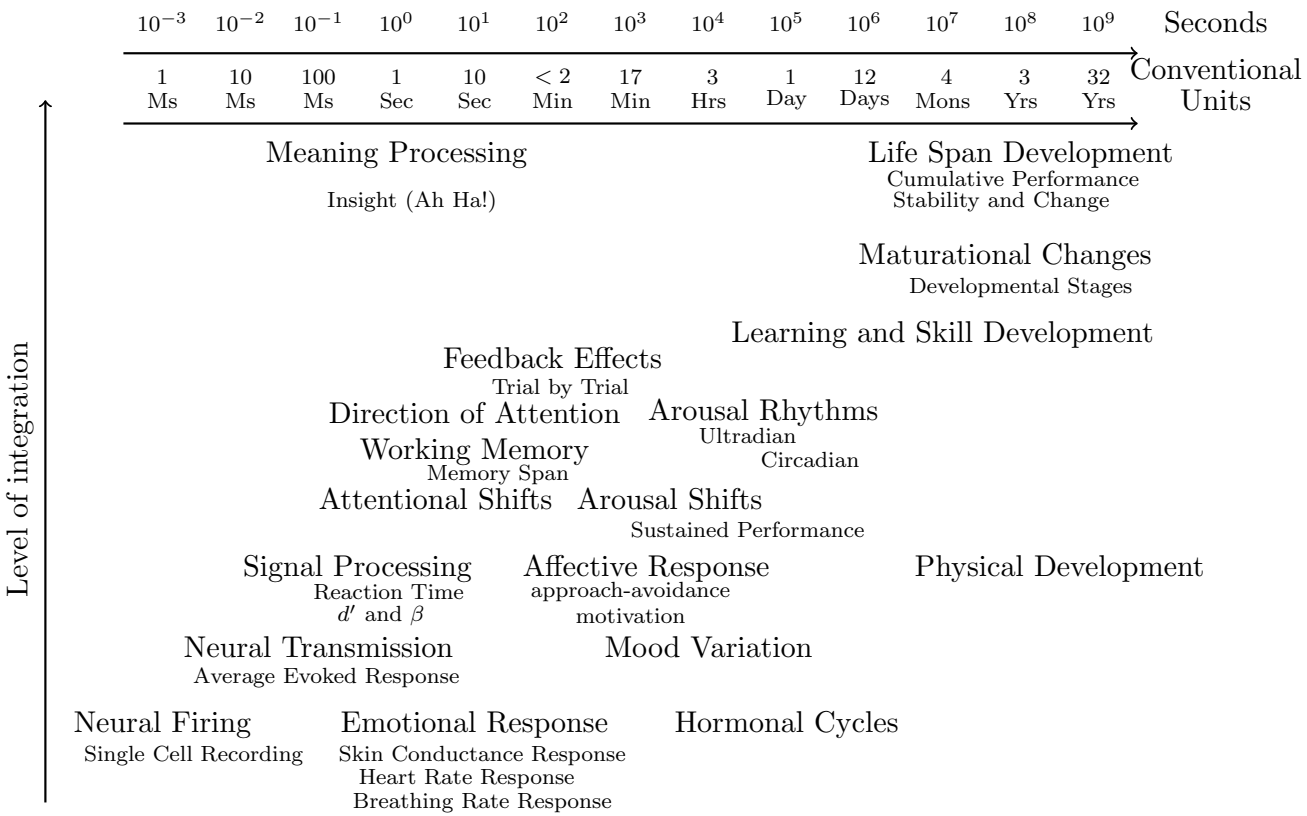
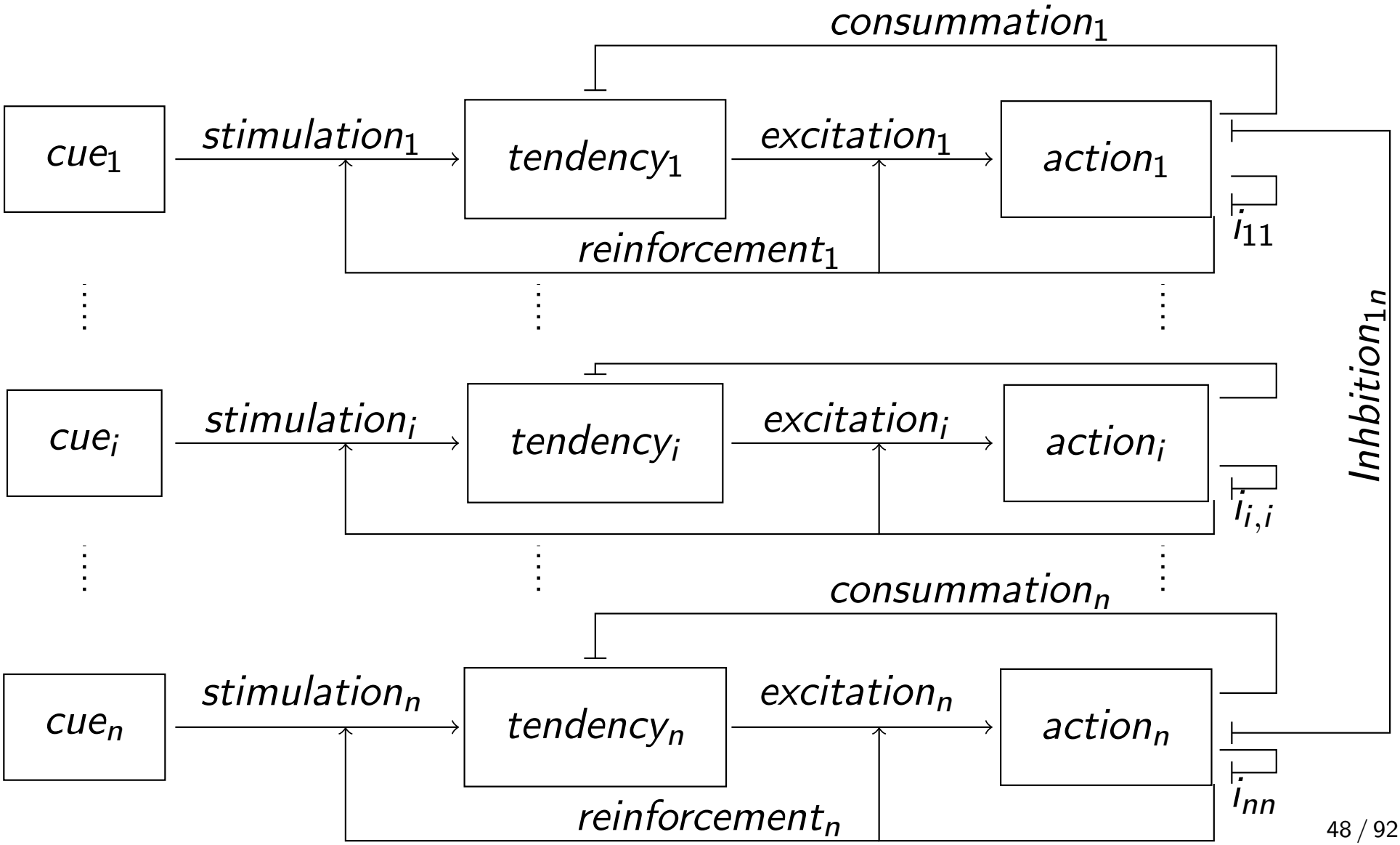


Figure 1. The psychological spectrum: The domain of psychological studies covers 12 orders of magnitude from the milliseconds of reaction time to the more than three billion seconds of a lifetime. Psychological phenomena range from the very biological to the complex adaptations and adjustments occurring over a lifespan. Dynamic processes occur at all of these temporal durations and although they require different measurement techniques and are studied by scientists in seemingly different areas (e.g. cognitive, motivational, developmental psychologists) they may all be analyzed in terms of their dynamics over time. Adapted from Revelle (1989)

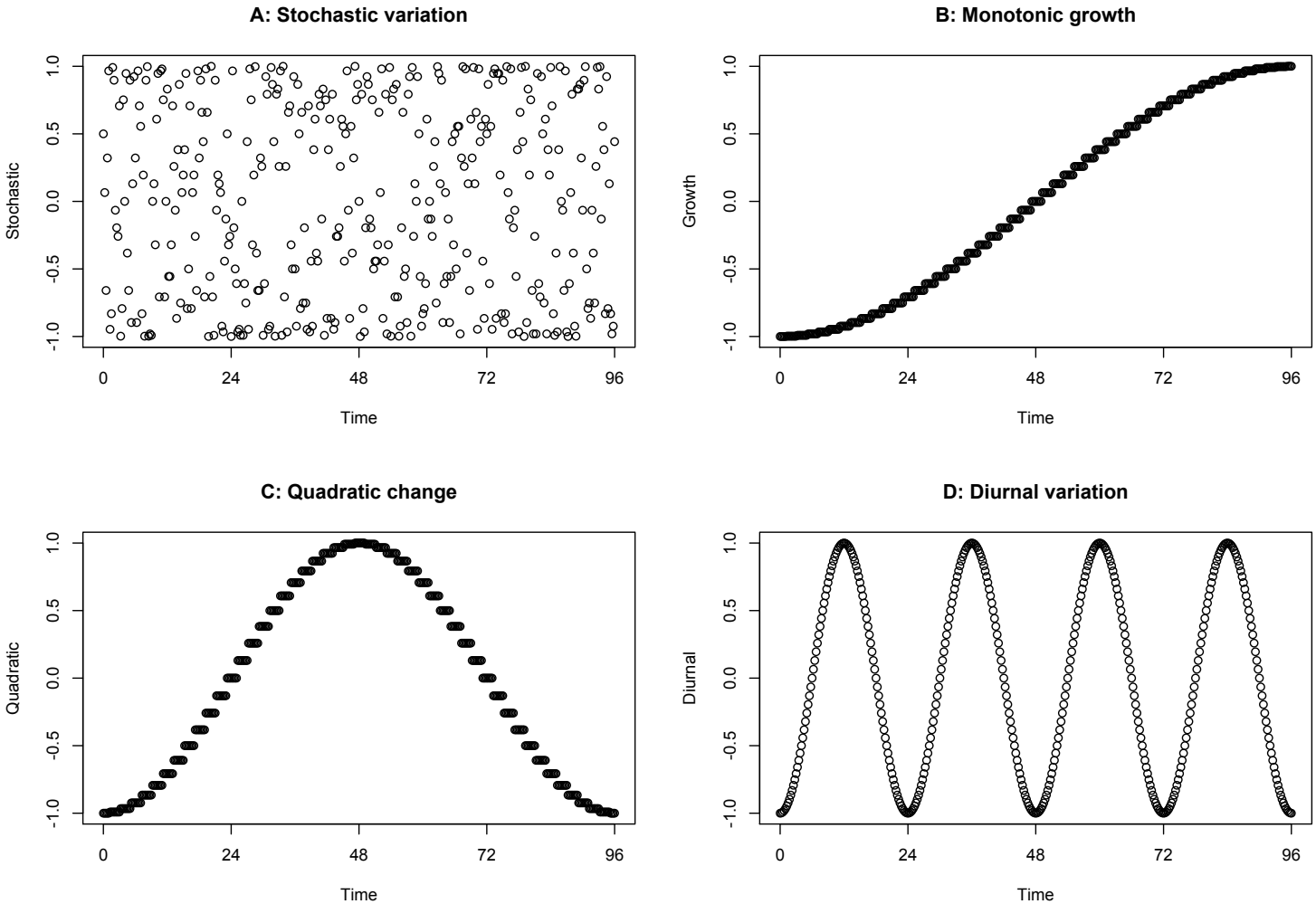
Cues Tendency Action model (Revelle & Condon, 2015)

$dt = Sc - Ca$ $dA = Et - Ia$



Stochastic variation is not a dynamic model

Need to understand underlying dynamic model



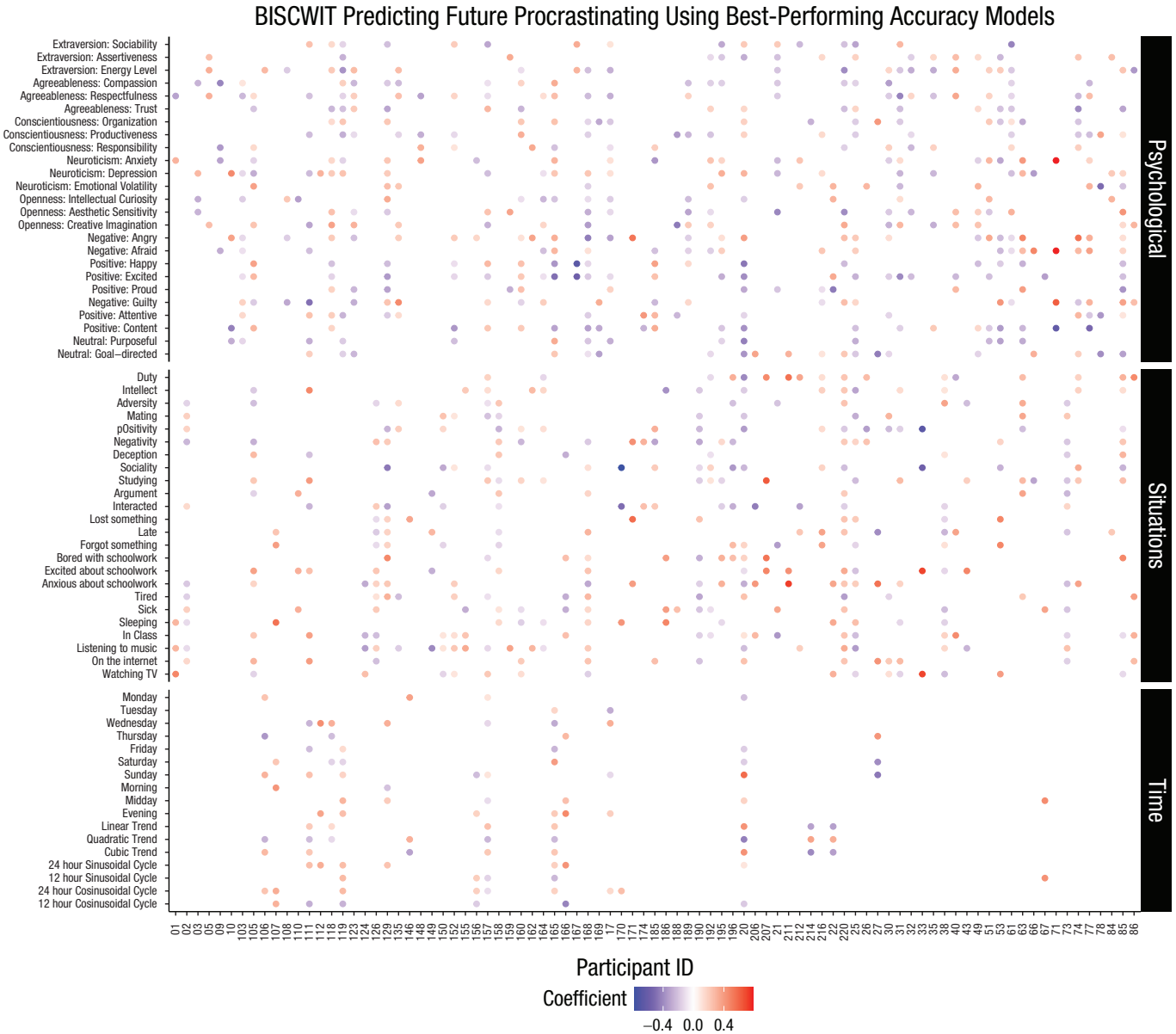
Personalized prediction of behavior

1. People differ
2. People differ across situations
3. Can we model how individuals differ across situations, differently (Beck & Jackson, 2022)

Idiographic person-situation test (Beck & Jackson, 2022)

1. 208 Washington U. undergraduates followed by ESM design
2. Personality and affect (BFI2 and PANAS)
3. Situations using the DIAMONDS scales Rauthmann, Gallardo-Pujol, Guillaume, Todd, Nave, Sherman, Ziegler, Jones & Funder (2014) (Duty, Intellect, Adversity, Mating, pOsitivity, Negativity, Deception, Sociaibility)

Individual predictability over time



Behavior Genetics and inheritance of individual differences

1. Until recently, little emphasis upon genetic mechanisms per se, but rather on proportions of variance explained through genetic relationship
2. Not much (until recently) recognition of distinction between structural versus regulatory genes
3. Conflict between BG findings and genome wide association studies (GWAS) –where is the missing heritability?

Behavior genetics

Experimental studies

1. Rats and selective breeding
   - Maze bright versus maze dull
   - Reactive versus non-reactive
2. Drosophila and selective breeding
   - Positive and negative geotaxis
   - Positive and negative phototaxis
   - Genes for clock timing
3. Dog breeding for 10,000 years

Simple genetic models

Single gene models - classic Mendelian genetics

1. (One Gene, One Disease)
2. Multiple alleles
3. Additive genetic variance
4. Non-additive (dominance/recessive) variance
5. Epistasis - interaction with other genes

   Leads to similarities among MZ twins, missing effect in GWAS

Simple genetic models: selection for fitness

1. Small variation in reproductive fitness leads to selection pressure to eliminate less fit allele
2. Non additivity (dominance/recessive) makes it harder to select out or fixate.
3. Balanced polymorphism has selective advantage for heterozygous rather than homozygous. (e.g., sickle cell, G6PD as defenses against malaria)
4. Mutation rate of $\approx .0001 => 3$/generation

Polygenetic models

1. Polygenes as sum of separate genes
2. Biometric analysis rather than conventional Mendelian analysis
3. Polygenetic traits assumed to be the case for complex behaviors
4. Work in the 1990s-2010s examined "genes of interest" and looked for behavioral differences

   Except for rare cases, candidate gene studies are probably not replicable effects
5. Genome Wide Association Studies (GWAS) examine correlations of Single Nucleotide Polymorphisms with phenotypic traits
6. GWAS studies are very well powered to detect very small effects
7. Inferences are limited to the population studied

The concept of heritability: sources of variance

Decomposition of phenotypic variance

1. Vp = Phenotypic variance
2. Vg = Additive genetic variance
3. Vd = Dominance (recessive) variance
4. Vi = epistatic (gene by gene interactions) Vam = assortative mating variance
5. Ve = environmental variance
   Ves = shared environmental (variance between families)
   Ve = non-shared enviromental (variance within families)
6. Cov (genetic by environment covariance)
7. Veg (genetic by enviroment interaction)

Heritability: a hodgepodge ratio

1. $h^2 = V_g/V_p$ narrow heritability
2. $h^2 = (V_g + V_d + V_i...)/V_p$ broad heritability
3. Both estimates are dependent upon variance as observed and imply nothing about what would happen if situations change.
4. Consider the case of height or CHD: Highly heritable but large environmental effects

   CHD rates double for Japanese living in US

   Height has gone up even though highly heritable

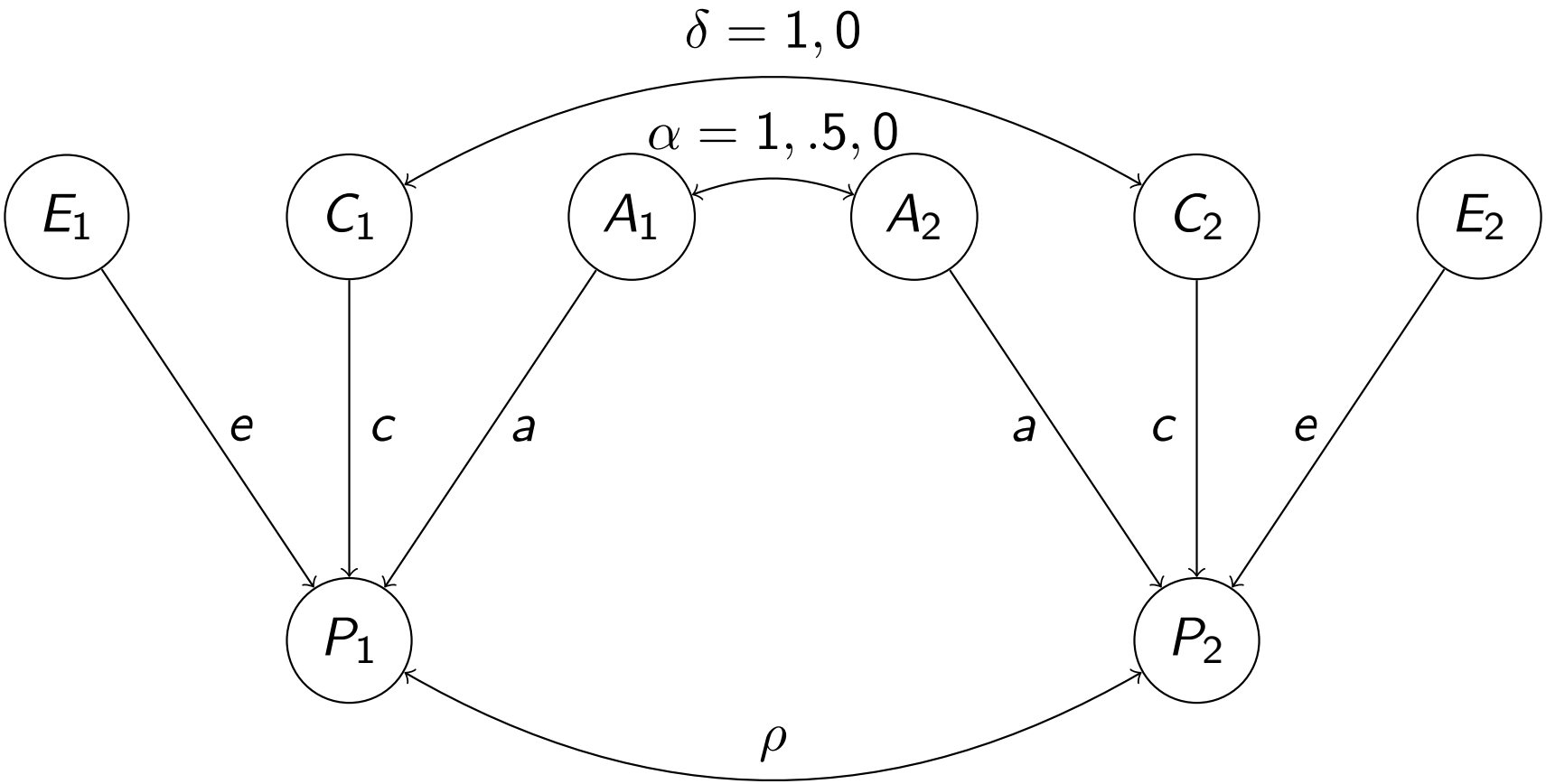
Estimating Heritability – BG

1. Twins: Experiments of nature
   - MZ: Identical genes
   - DZ: 50% (on average) genetic relationship
2. Family composition: experiments of humans
   - MZa: Identical genes, no shared environment
   - MZt: identical genes, shared family environment
   - DZa: 50% shared genes, no shared environment
   - DZt: 50% shared genes, shared family environment
   - Siblings together 0% shared genes, shared family environment
   - Adopted: 0% shared genes, shared family environment
   - Parent-child: 50% shared genes, shared familiy environment
3. Minnesota Study of Twins Reared Apart (MISTAR) (Bouchard, Lykken, McGue, Segal & Tellegen, 1990; Segal, 2017)
4. Major twin studies include Texas (Harden, Tucker-Drob & Tackett, 2013), Minnesota Twin Family Study (Johnson, Turkheimer, Gottesman & Thomas J. Bouchard, 2009)

ACE models: Additive genetic, Common environment, unique Environment

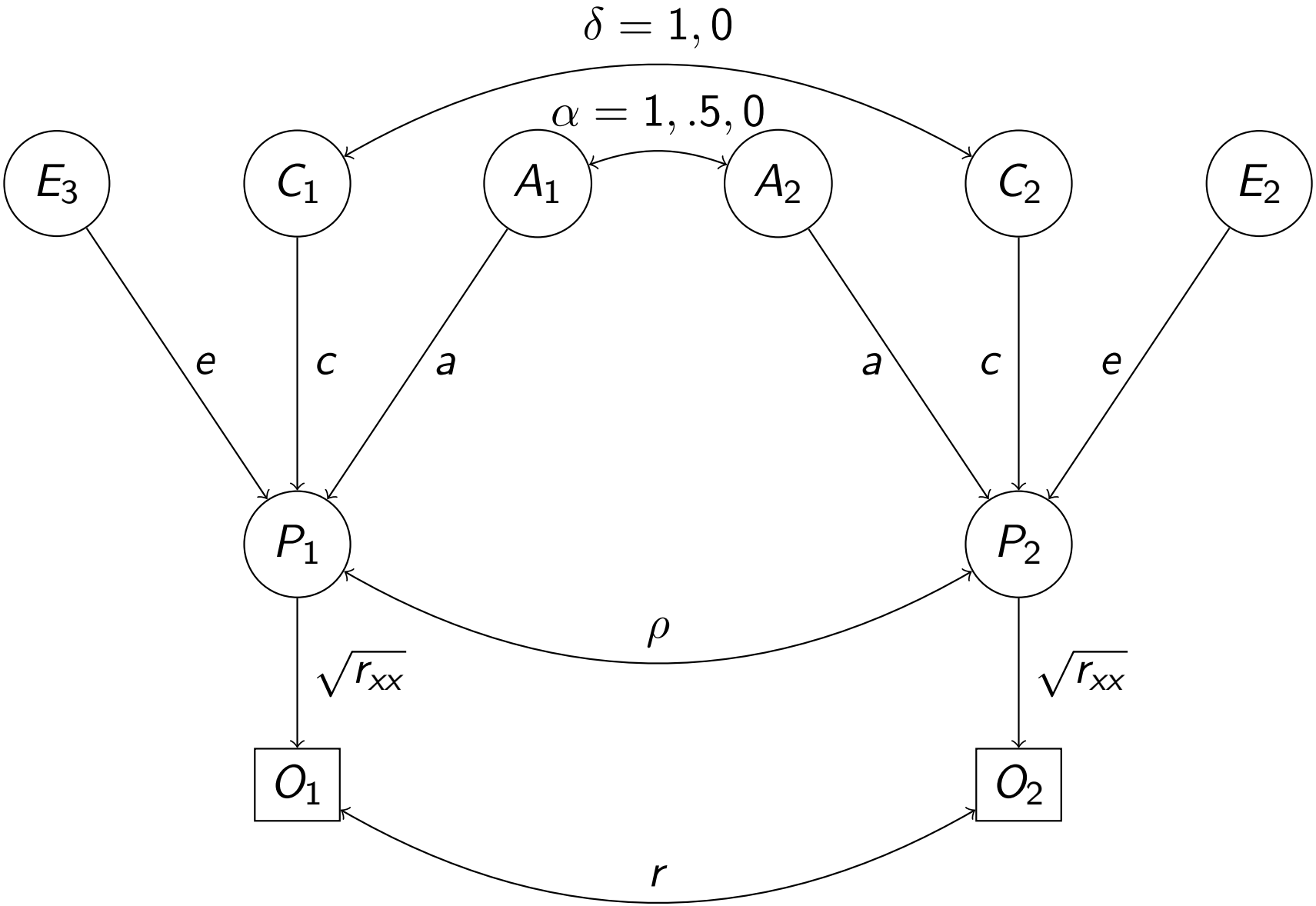
- Sources of variance in the common behavioral genetic models
  - Additive genetic variance
  - Shared family environmental variance
  - Unique environmental variance
- Modeled by the association between various family combinations
  - Monozygotic twins raised apart (sharing just genetic variance)
  - Monozygotic twins raised together (sharing genetic + environmental variance)
  - Dizygotic twins raised apart (sharing .5 genetic variance)
  - Dizygotic twins raised together (sharing .5 genetic + environmental variance)
  - Adopteds together (sharing just environmental variance)
  - unrelateds apart (sharing nothing)
- Estimate $\sigma_g^2, \sigma_c^2, \sigma_e^2$ and define $h^2 = \frac{\sigma_g^2}{\sigma_g^2+\sigma_c^2+\sigma_e^2}$

ACE path model: no error correction



$\alpha = 1, .5, 0$ and $\delta = 1, 0$ depending upon family configuration.

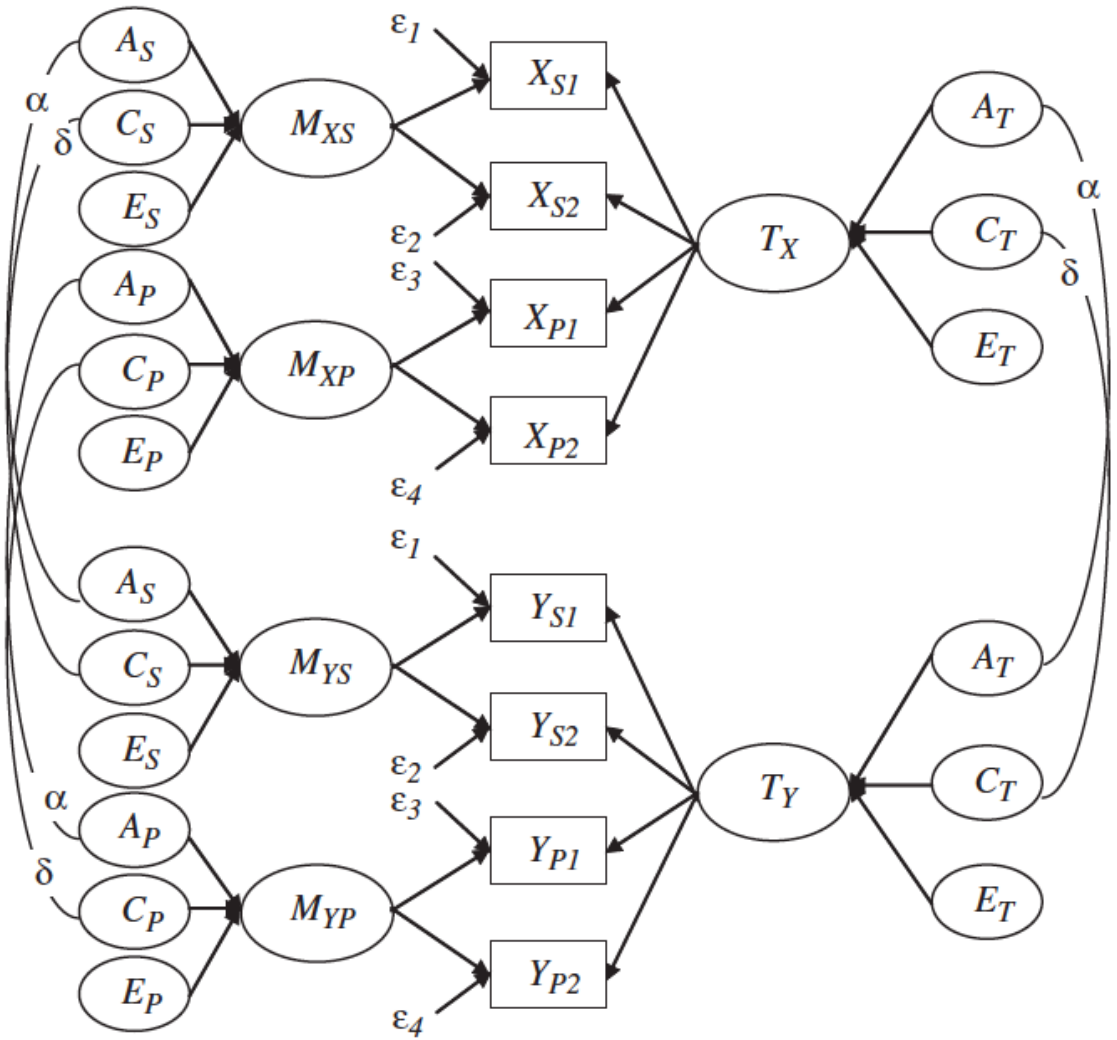
ACE model: with error correction. Model the observed correlations.



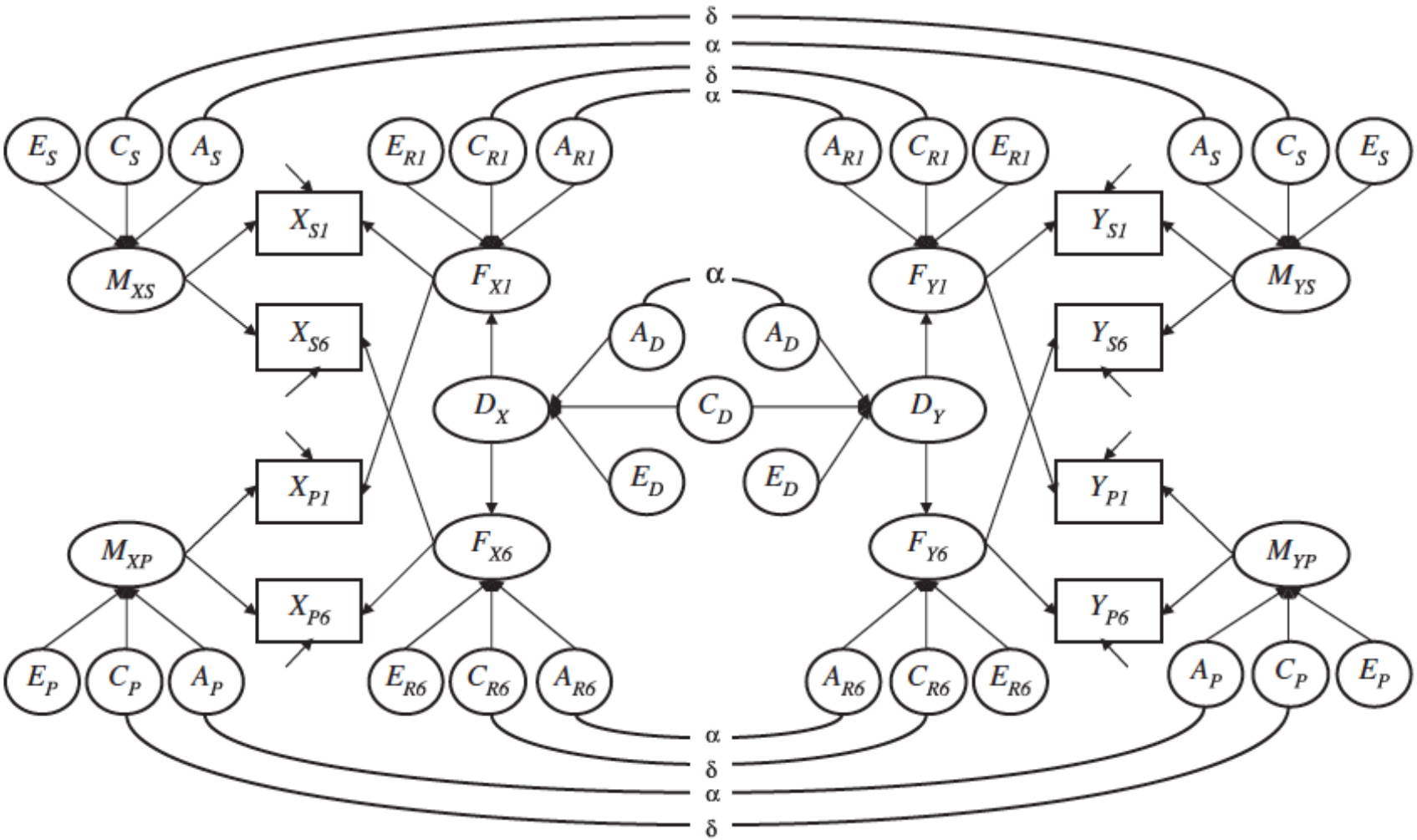
Genetic analysis in the German Observational Study of Twins

- Borkenau, Riemann, Angleitner & Spinath (2001a,b); Spinath, Angleitner, Borkenau, Riemann & Wolf (2002); Spinath & O'Connor (2003); Borkenau, Mauer, Riemann, Spinath & Angleitner (2004a,b); Spinath & Wolf (2006) report on the multi method analysis of personality and genetics.
  - Self report measures on the German NEO-PI-R.
  - Peer report measures on the peer version of the NEO.
- Analyzed the NEO at both the domain level (Big 5) as well as the facet level.
- Did this analysis for each pair of twins.

Multi method (self and peer) genetics analysis



Multi method (self and peer), multi-facets, genetics analysis



Personality and Genetics

Results from a meta analysis (McGue & Bouchard, 1998)

Trait	Narrow Heritability	Broad Heritabiliy Heritability	Shared Environment
Extraversion	0.36	0.49	0.09
Neuroticism	0.28	0.39	0.04
Agreeableness	0.28	0.38	0.05
Conscientiousness	0.31	0.41	0.05
Openness	0.46	0.45	0.04
IQ	0.50	0.75	0.00

McGue & Bouchard (1998)

Interests and Genetics

Results from a meta analysis (McGue & Bouchard, 1998)

Occupational Interest	Narrow Heritability	Broad Heritability	Shared Environment
Realistic	0.36	0.41	0.12
Investigative	0.36	0.66	0.10
Artistic	0.29	0.50	0.12
Social	0.38	0.2	0.08
Enterprising	0.31	0.50	0.11
Conventional	0.38	0.38	0.11

Psychopathology and Genetics

Results from a meta analysis

Psychiatric Illness	Broad Heritability	Shared Environment
Schizphenia	.80	No
Major Depression	0.37	No
Panic Disoder	0.30-.40	No
Generalized Anxiety	0.30	small, females
Phobias	0.2 - 0.4	No
Alcoholism	.50-.60	Yes

Bouchard (2004)

Social Attitudes and Genetics

Results from a meta analysis

Social Attitudes	Broad Heritability	Shared Environment
Conservatism		
Under age 20	0	Yes
Over age 20	.45-.65	Yes, females
Right Wing Auth	.50-.64	0-.16
Religiousness (adults)	0.30-.54	.2 - .4
Specific Religion	0	NA

Bouchard (2004)

Heritaility: misconceptions

High heritability => Constancy: but

1. Heritability changes by changing the environment
2. $h^2 = Vg/Vp = Vg/(Vg + Ve)$
3. Reducing environmental variation increases the heritability
4. Herrnstein's paradox: higher heritabilities imply more equal environments
5. Low heritability =>high environmental inequality

Heritability: misconceptions 2

1. Heredity vs. environment
2. Genes code proteins, not behavior
3. Genes act through environment
4. meaningless as asking "Which is more important in area of a rectangle: height or width?"
5. Environment affects gene expression
6. Individuals versus populations
7. Variance estimates are population based, not for individual – Variations in environments affect estimates

Heritability and group differences

Does within group heritability imply between group heritability?

1. Consider the case of height
2. Within group differences are highly heritable – h^2 of roughly .8-.9
3. almost no known genes
4. Dutch have become taller over past 50 years
5. North -South Korean differences of 3-6 inches

Heritability and environment

Strong genetics do not imply can not be modfied

1. Phenylketonuria is inability to process phenylalanine
2. PKU is a Mendelian recessive gene
3. Effect without environmental manipulation is severe brain retardation
4. Phenylalanine diet stops the effect
5. With proper diet, no effects (but girls are still carriers of PKU gene and their fetus is at risk if mother is not on PKU diet)
6. Also consider the example of myopia: Heritable but eye glasses work!

The power of genetically informed designs to detect enviornmental effects

1. Many important findings confound genetic and environmental effects
2. By doing genetically informed studies, we can tease out real effects (Koellinger & Harden, 2018) Kong (2018)
3. Differences in outcomes of siblings within families allow for purer examination of developmental effects (e.g., Arden, Luciano, Deary, Reynolds, Pedersen, Plassman, McGue, Christensen & Visscher, 2016)
4. Parents transmit 50% of their genes but 100% of their environment.
5. Parental nurturing effects can be transmitted even though the specific genetic alleles are not.
6. To not conduct or at least be aware of genetically informed studies is tantamount to scientific misconduct (Schmidt, 2017)

1. Individual differences versus experimentalism
2. Theories of individual differences
3. Descriptive taxonomies
   Folk taxonomies
   Recent work in folk taxonomy: the Big 5 Five Factor Model of Traits
4. Causal models
5. Psychometric theory

Ways of studying personality coherence and the ABCDs

1. Between individual differences across items
2. Between individual differences across situations and across time
3. Within person variation across items, situation and time
4. Are within person patterns different across people?

The ABCDs of personality

1. Affect: What we feel
2. Behavior: What we do
3. Cognition: What we think
4. Desire: What we want
5. Environment: Where we are

Extraversion and the ABCDs

1. Extraversion as positive Affect
2. Extraversion as approach Behavior
3. Extraversion as cognitive bias towards rewards
4. Extraversion as performance approach Desires

Achievement Motivation and the ABCDs

1. Achievement as positive Affect upon Success
2. Achievement as approach Behavior
3. Achievement motivation as Cognitive Appraisals of task difficulty
4. Achievement motivation as Goal setting (Desires)

Anxiety and the ABCDs

1. Anxiety as negative Affect
2. Anxiety as avoidance Behavior
3. Anxiety as cognitive bias towards threats
4. Anxiety as performance avoidance Desires

Causal Models

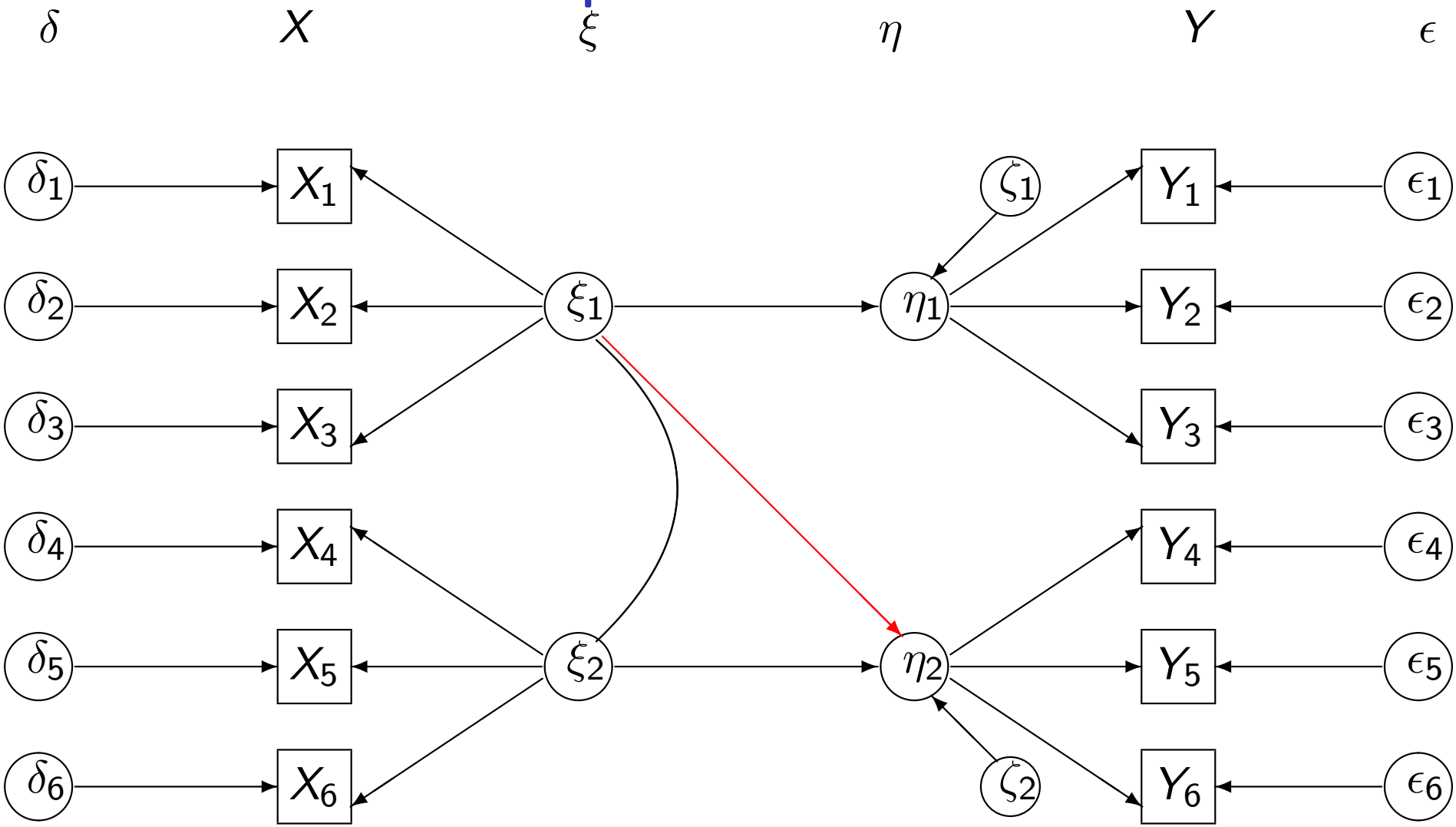
Approach and Inhibitory traits

1. Approach/Positive Affect/Positive Emotionality
   - Extraversion/impulsivity/Achievement
   - Problems with simple state theories
   - Traits as central tendency of state
   - Traits as likelihood of state
   - Traits as rates of change in state
2. Avoidance/Inhibition/negative Emotionality • Anxiety/Depression

Personality Theory and Personality Measurement

1. If it exists, it exists in some amount ...
2. Issues in measurement
   - Latent constructs - observed variables
   - Shape of relationship between latent and observed
3. Reliability of measurement
4. Multiple forms of reliability

A complete structural model



Factor Analysis/Components Analysis/Cluster Analysis

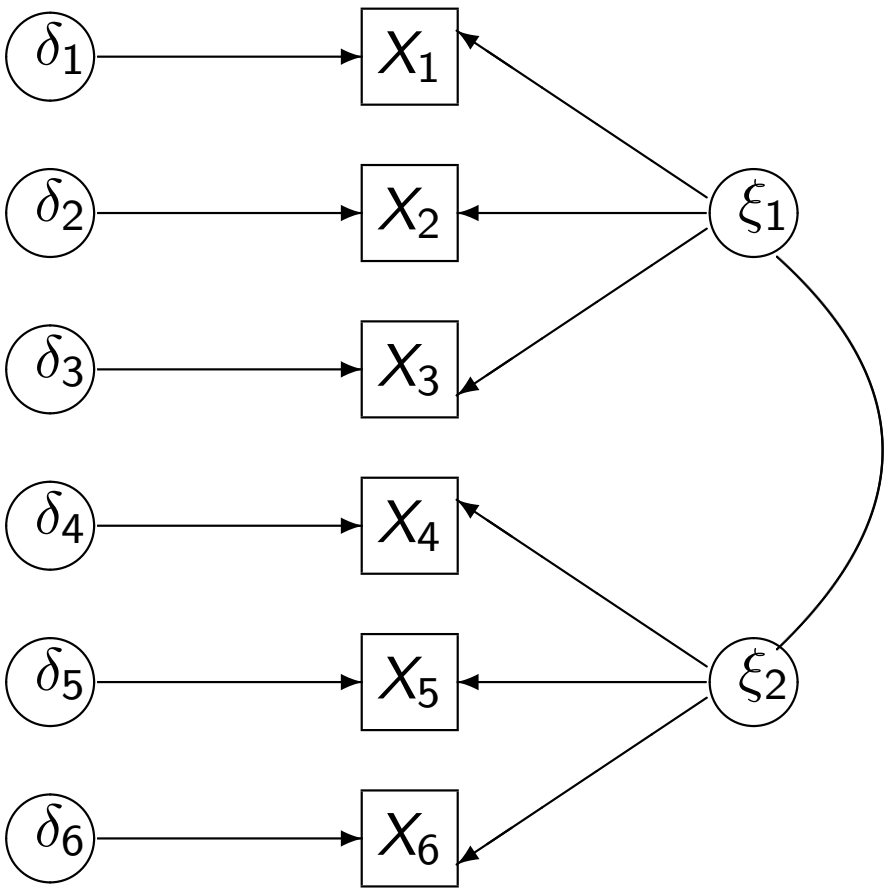
1. Data simplification and Ockham's Razor: "do not multiple entities beyond necessity"
2. Can we describe a data set with a simpler representation of the data.
3. Is it possible to combine subjects and or variables that are redundant?
4. Or almost redundant (without losing very much information)
5. This is a problem in projective geometry. Can we project from a high dimensional space into a lower order space.

Reliability

1. How well are we measuring whatever we are measuring?
2. Internal consistency of measures
   Domain sampling, true score theory
3. Stability of measures
   Traits versus states
4. Alternate forms/alternate people

A measurement model for X

δ X ξ



Validity

1. How well are we measuring what we think we are measuring
2. Face, Concurrent, Predictive, Construct
3. Construct
   - Do measures of the same thing go together/
   - Do measures of different things not go together
   - So what (does it make a difference)

Methods of Scale Construction

1. Empirical
2. Rational/Theoretical
3. Homogeneous
4. Do they make a difference?
5. How to do it

Sources of data

1. Not limited to simple self report, need to be sensitive to threats to validity from many sources
2. Multi-traits - multi methods and the principles of convergent and discriminant validity

Final research project

1. Introduction
   - Review of relevant literature
   - Why is the problem an interesting problem
2. Method
   - Enough to be replicated
3. Results
   - Appropriate analysis
4. Discussion
   - What does it all mean?

Final research project

Additional comments

1. APA style throughout
2. Writing to be yours, thoughts can be shared with research partners (and others)
3. Analysis
   can be done with me
   Schedule appointments
   walk in, email, etc.

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