ED-DMT1 and Other Emerging Eating Pathologies: What and Why?

Diabulimia Helpline Conference

Nov 2018

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Historical Perspective

- **1689 – Richard Morton publishes first medical description of 'Phthisis Nervosa'**
- **1873/74 – Lasegue and Gull coin the term Anorexia Nervosa**
- **1978 – Hilde Bruch offers a psychologically minded conceptualization of AN in The Golden Cage: The Enigma of Anorexia Nervosa.** "This tragic illness befalls the daughters of intellectual and sophisticated families"
- **1979 – Gerald Russell coins the term Bulimia Nervosa as a "malignant variant of AN"**

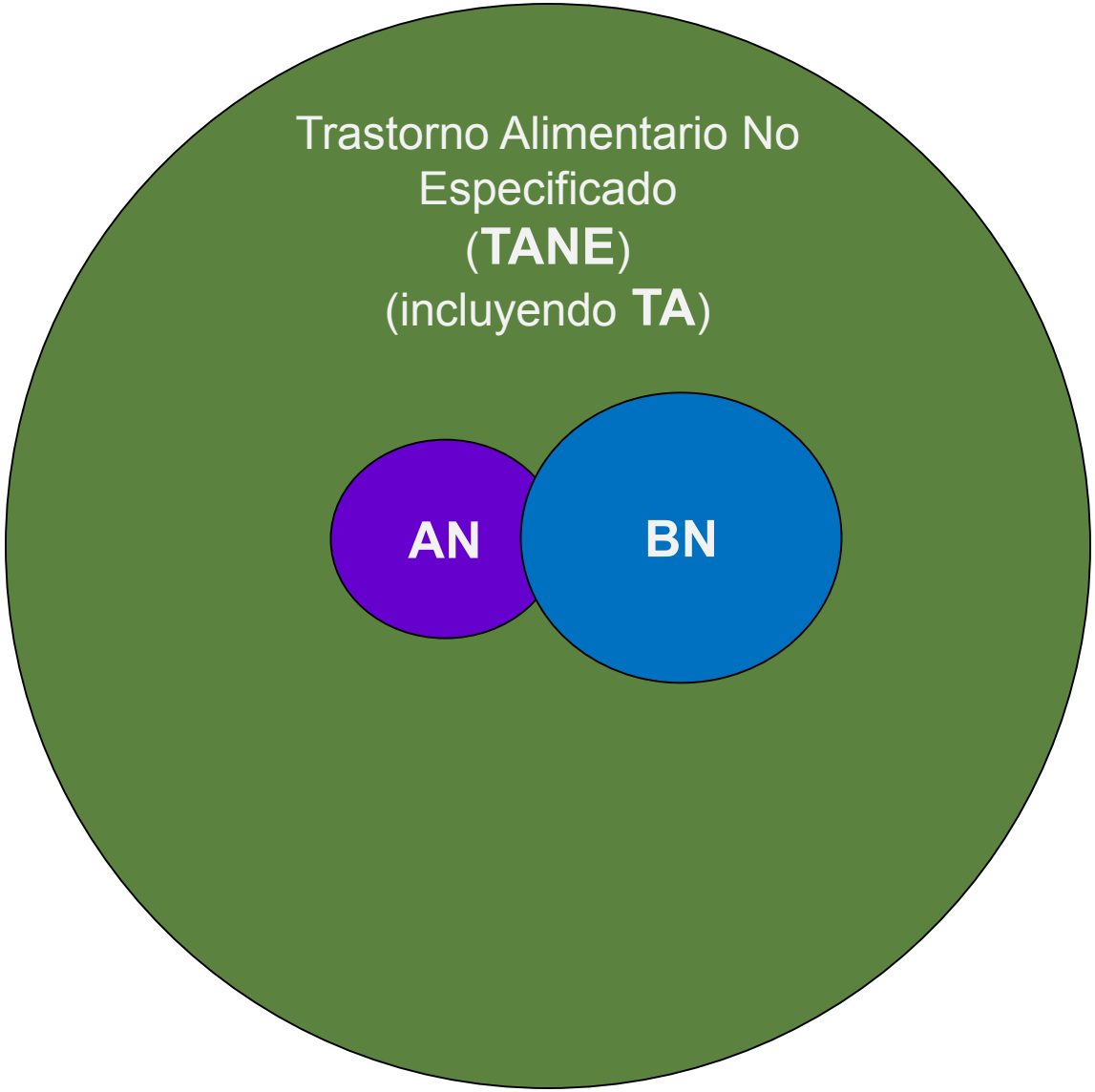
Historical Perspective

- Stable and longstanding single symptom complex, AN, with a single variant, BN
- Predominance of Caucasian females of European descent
- Thought to be behavioral, psycho-social, cause by parents
- very recently recognized as a complex psychopathology – a brain disorder – “a serious mental illness”

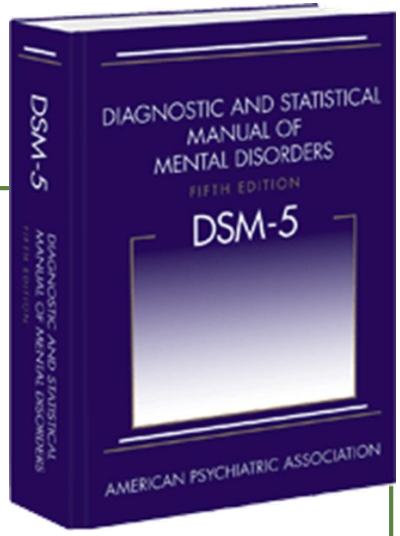
Historical Perspective

- What the field has seen in the last 2 decades is a significant emergence of new clinical presentations, broader gender and age representation, erosion of what once appeared to be protective socio-cultural factors, and expansion to include all races and ethnicities.
- Gender dysphoria is yet another layer in the complexity of eating pathology

DSM-IV DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS



Mayo 2013



Other Specified Feeding or ED
(**OSFED**)
+
Unspecified Feeding or ED
(**UFED**)

AN

BN

BED

ARFID

Rumination Disorder

Pica

- So what are we seeing in new manifestations of eating disorders?

ED syndromes w/o diagnostic Criteria

- Caloric restriction for longevity
- Anorexia athletica
- Bulimic multi-impulsive syndrome
- Orthorexia
- Manorexia
- Pregorexia
- Drunkorexia (ICB-WGA or Inappropriate Compensatory Behavior to Avoid Weight Gain from Consuming Alcohol)
- ED in “mature women and men”
- Muscle dysphoria
- Health dysphoria

Medical co-morbidities with EDs

- Hypothyroidism / hyperthyroidism
- Cystic Fibrosis
- Cerebral Palsy
- Turner Syndrome (45X)
- Inflammatory Bowel Disease / Irritable Bowel Syndrome
- Fibromyalgia
- Narcolepsy
- Food allergies and food intolerances: Lactase deficiency, Celiac disease, NCGI

EDs that have emerged

- The Dual Diagnosis of Eating Disorder and Diabetes Mellitus Type 1 (ED-DMT1 or Diabulimia)
- Avoidant / Restrictive Food Intake Disorder (ARFID)
- Atypical Anorexia Nervosa

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Historical perspective

- Diabetes is the fastest increasing disease worldwide
  - NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in diabetes since 1980: a pooled analysis of 751 population-based studies with 4·4 million participants. Lancet 2016; 387: 1513–30

Current classification

- Sub-groups
  - DMT1 (islet beta cell autoantibodies positive)
  - DMT2 (75-85%) (islet beta cell autoantibodies negative)
  - LADA (<10%) Latent Autoimmune Diabetes in Adults (glutamic acid decarboxylase antibodies (GADA) positive)
- Monogenic forms
  - Neonatal diabetes
  - Maturity onset diabetes of the young

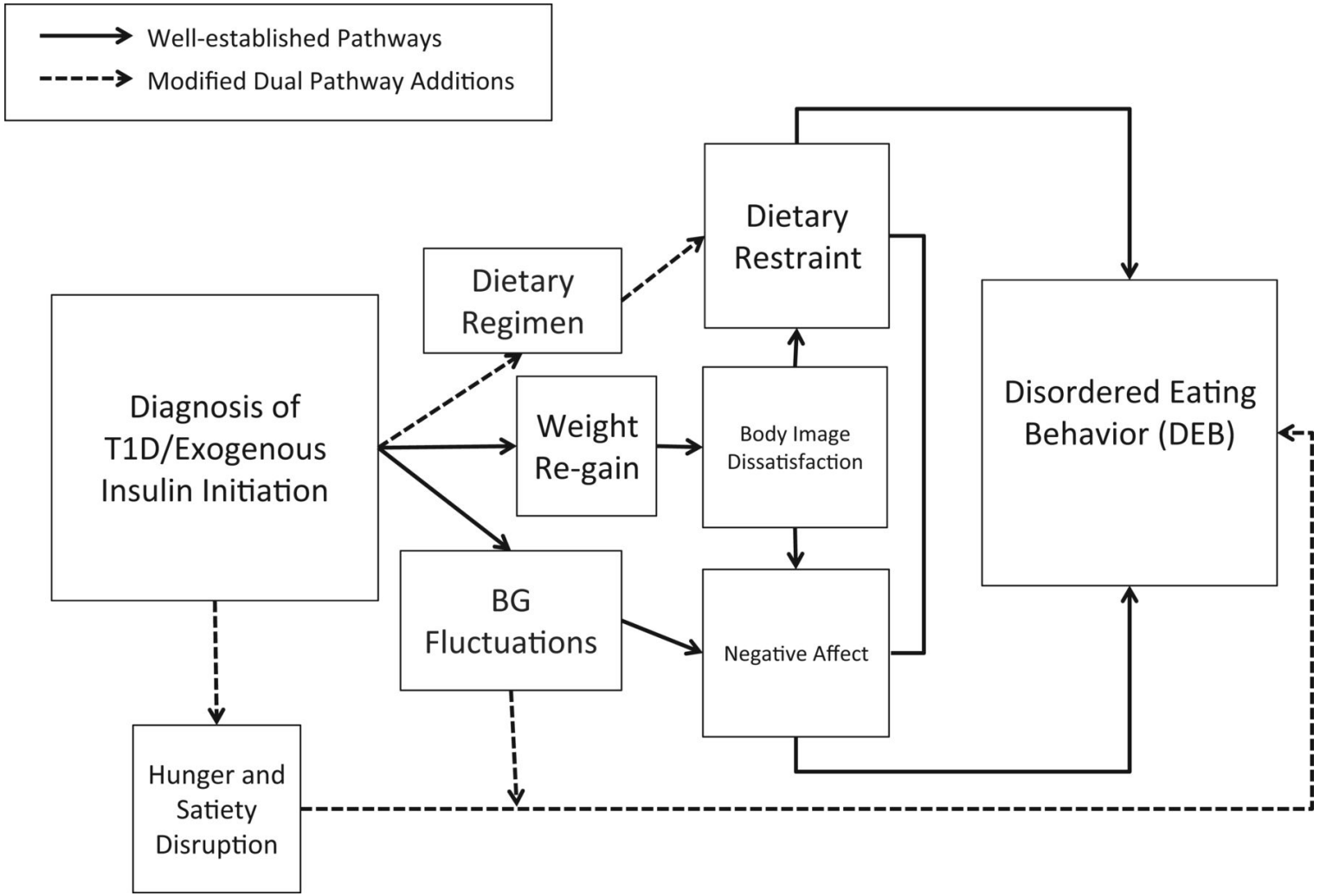
Proposed classification
(N=8,980, 5,334 males)

- Cluster 1 – 6.4% - Severe Autoimmune Diabetes (SAID)
- Cluster 2 – 17.5% - Severe Insulin Deficient Diabetes (SIID)
- Cluster 3 – 15.3% - Severe Insulin Resistant Diabetes (SIRD)
- Cluster 4 – 21.6% - Mild Obesity Related Diabetes (MOD)
- Cluster 5 – 39.1% - Mild Age-Related Diabetes (MARD)

Definition of ED-DMT1

- **Intentional omission of prescribed insulin (by strategically decreasing, delaying, or completely omitting) for the purpose of inducing hyperglycemia and rapidly loosing calories in the urine in the form of glucose and thus weight loss or avoidance of weight gain**

The Modified Dual Pathway Model.



Claire M. Peterson et al. J. Pediatr. Psychol. 2014;jpepsy.jsu106

Journal of PEDIATRIC PSYCHOLOGY

The Modified Dual Pathway Model

- Proposes 4 disease-based mechanisms through which DEB is potentiated in youth with T1D
  - carbohydrate counting driving imposed food preoccupation
  - weight fluctuations associated with variable use of insulin and subsequent body dissatisfaction
  - blood glucose fluctuations associated with mismatched insulin dose, excessive caloric intake secondary to hypoglycemia, and resultant weight gain
  - Response to hypoglycemia may trigger binging like behaviors – eat when not hungry

Additional biology at play…

- DMT1 involves weight loss associated with cessation of endogenous insulin production from beta cell death (Jahromi & Eisenbarth, 2007)
- interruption of amylin production, associated with hunger and satiety regulation (Lutz, 2005). Amylin mediates several satiety mechanisms via its effects on the area postrema, an area of the brainstem that integrates hormonal and metabolic signals to regulate food intake (Mack et al., 2007)
- ghrelin is disrupted and is posited to increase hunger and promote dysregulated eating (Prodam et al., 2014).

Increased mortality

- **Highest mortality rates**
  - **10 year, Scandinavian registry study, deaths per 1,000 person years**
    - **2.2 for DMT1**
    - **7.3 for AN**
    - **34.6 for concurrent**
    - **17X for DMT1 and 5X for AN**
      - Nielsen S, et al; Mortality in Concurrent Type 1 Diabetes and Anorexia Nervosa, Diabetes Care 25:309-312, 2002
      - Nielsen et al; Eating disorders in females with type 1 diabetes: An update of a meta-analysis, *European Eating Disorders Review* 10:241-254, 2002

Management

- **All patients with DMT1 who are diagnosed with ED should be considered for medical inpatient stabilization or ED inpatient treatment due to the high morbidity and increased mortality risk.**

Looking ahead…

- Unusual clinical presentations (ED-DMT1)
  - Deliberate induction of hypoglycemia
    - Seeking thinness
    - Justifying binges
  - Self injury using diabetic paraphernalia
    - Cutting self
    - Stabbing self

Volume 22 Number 3
Summer 2009

Diabetes Spectrum

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Eating Disorders

A GUIDE TO MEDICAL CARE AND COMPLICATIONS

3rd edition

edited by
Philip S. Mehler, MD, FAED
and
Arnold E. Andersen, MD

EDs that have emerged

- The Dual Diagnosis of Eating Disorder and Diabetes Mellitus Type 1 (ED-DMT1 or Diabulimia)
- **Avoidant / Restrictive Food Intake Disorder (ARFID)**
- Atypical Anorexia Nervosa

(ARFID) 307.59 (F50.89) – diagnostic criteria

A. An eating or feeding disturbance (e.g. apparent lack of interest in eating or food, avoidance based on the sensory characteristics of food; concern about aversive consequences of eating) as manifested by persistent failure to meet appropriate nutritional and/or energy needs associated with one (or more) of the following:
   1. Significant weight loss (or failure to achieve expected weight gain or faltering growth in children).
   2. Significant nutritional deficiency.
   3. Dependence on enteral feeding or oral nutritional supplements.
   4. Marked interference with psychosocial functioning.

(ARFID) 307.59 (F50.89) – diagnostic criteria

B. The disturbance is not better explained by lack of available food or by an associated culturally sanctioned practice.

C. The eating disturbance does not occur exclusively during the course of anorexia nervosa or bulimia nervosa, and there is no evidence of a disturbance in the way in which one's body weight or shape is experienced.

D. The eating disturbance is not attributable to a concurrent medical condition or not better explained by another mental disorder. When the eating disturbance occurs in the context of another condition or disorder, the severity of the eating disturbance exceeds that routinely associated with the condition or disorder and warrants additional clinical attention.

ARFID is…

- A serious eating disorder whose medical complications are commensurate with the degree of underweight and malnutrition and similar to that of AN

ARFID prevalence…

- Incidence and prevalence are unknown
- More common in children and young adolescents
- Less common in late adolescence and adulthood
- Present throughout the lifespan, both genders
- Often associated with psychiatric co-morbidity, especially with anxious and OC features

ARFID diagnosis…

- Still a new diagnosis (May 2013)
- Many clinicians are not familiar with ARFID as a diagnostic category or lack knowledge of the diagnostic criteria
- This may lead to misdiagnosis or delay in diagnosis

ARFID diagnosis…

- Clinical presentations of ARFID vary widely and may both depend on and evolve with the developmental context

ARFID types…

- Avoidant
- Aversive
- Restrictive
- Mixed type
- ARFID “Plus”

ARFID types…

- Avoidant
  - Individuals whose food refusal is related to adverse or fear based experiences (phobic avoidance)
    - choking
    - Nausea / vomiting
    - pain
    - swallowing
    - Fear of anaphylaxis

ARFID types…

- Aversive
  - Individuals who accept only a limited diet in relation to sensory features (sensory sensitivity)
    - Sensory aversions (food only vs. others senses)
    - Sensory over-stimulation (e.g., “super tasters” for bitterness prefer sweet tastes)
    - Consider sensory processing disorder

ARFID types…

- Restrictive
  - Individuals who do not eat enough and show little interest in feeding or eating (low appetite)
    - Extreme pickiness
    - Distractible and forgetful
    - Wishing they would eat more

ARFID types…

- Mixed Type
  - Restrictive/avoidant/aversive features that co-exist at time of diagnosis but were not all present at onset of symptoms
  - Usually baseline restrictive with acquired avoidant/aversive features
  - Other combinations possible

ARFID types…

- ARFID "Plus"
  - Individuals with avoidant, aversive, or restrictive types of ARFID presentations who begin to develop features of AN
    - Concerns about body weight and size
    - Fear of weight gain
    - Negativity about fatness
    - Negative body image without body image distortion
    - Preference for less calorically dense foods

ARFID management…

- **Critical ingredients**
  - Expertise in all specialty areas
  - Confidence in working with families
  - Team alignment
  - Tight communication
  - Ability to individualize treatment and still adhere to core principles of treatment
  - Tx goals include moving from disempowered or disinterested to empowered and motivated

Emerging ARFID types

- ARFID – BED

- People with diabetes can also develop ARFID

EDs that have emerged

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- **Atypical Anorexia Nervosa**

Atypical Anorexia Nervosa

- all of the criteria for AN are met, except that despite significant weight loss, the individual's weight is within or above the normal range.

AN vs. Atypical AN (Sawyer et al 2016)

- Medical complications were similar
- no significant differences were found on resting pulse rate, frequency of bradycardia, marked orthostatic changes, hypothermia, or requiring hospital admission
- No differences on measures of binge eating, purging, psychiatric comorbidity, use of psychotropic medications, self-harm, suicidal ideation, severity of depressive symptomology, or obsessive / compulsiveness
- Atypical Anorexia more likely to have a history of meeting BMI criteria for “overweight” or “obese” and were less likely to experience amenorrhea

Sawyer SM, Whitelaw M, Le Grange D, et al. Physical and Psychological Morbidity in Adolescents With Atypical Anorexia Nervosa. Pediatrics. 2016; 137 (4).

- So <u>why</u> are we seeing these new manifestations of eating pathology?
  - Are we tapping into new layers of genetic vulnerability"
    - Pervasive stress related to increasing life complexity
    - Overwhelming stimuli challenging neurobiology

Heritability Estimates

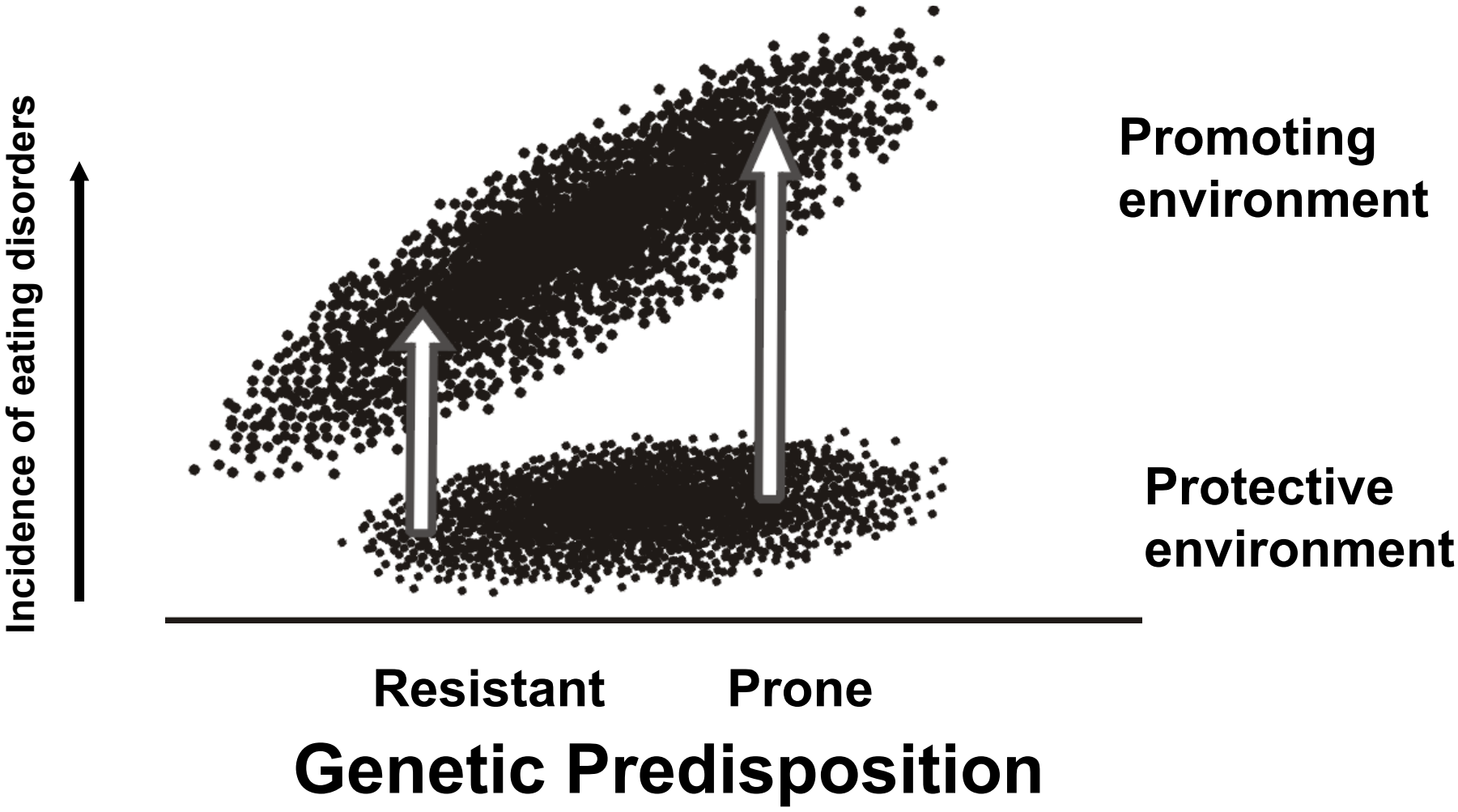
Disorder	Heritability
Autism	0.8 – 1.0
Schizophrenia	0.5 – 0.9
Bipolar Disorder	0.3 – 0.8
AN / BN	0.5 – 0.8
early MDD	0.5 – 0.75
OCD	0.5 – 0.7
Obesity	0.4 – 0.7

Treasure & Holland 1990; Fichter & Noegel 1990; Holland et al 1984, 1988; Hsu et al 1990; Kendler et al 1991, 1995; Walters & Kendler 1995; Bulik et al 1998; Klump et al, submitted

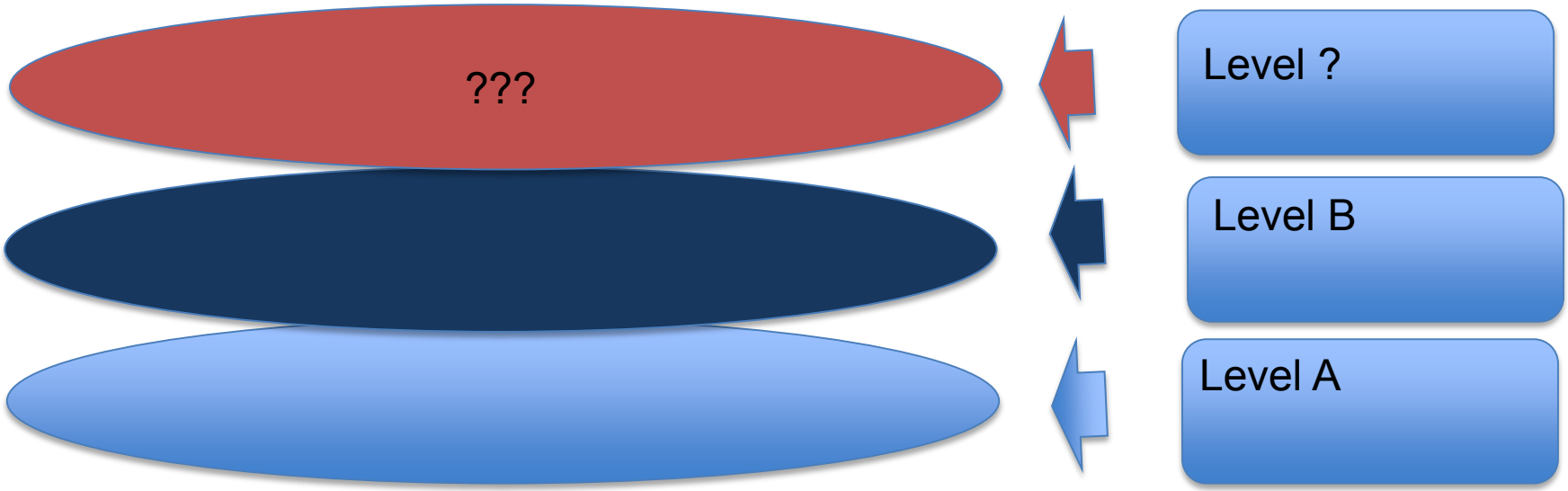
Etiology of Eating Disorders

- gene x environment interaction

Eating Disorders: genetics and environment



Are we tapping into new layers of genetic risk?



- We have perceived stress as external stimuli that lead to a negative perception, challenge or difficulty.

Do we need to begin to look at stress as the impact of exposures that we have not evolved tolerance to and tolerate only with downstream negative consequences? Specifically to our brains?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The toxicity of our environment may not only be mediated by negative experiences like natural disasters or trauma but also by exposure to “positive stimuli” that we have created.

Are we exceeding our brain’s capacity to tolerate external stimuli?

Take-aways…

- We are likely to learn more about the effect of stress and exposures on neurobiological function
- In the meantime, ear to the ground about emergence of yet more eating pathology manifestations and variants


Our best discoveries are ahead of us.
Thank you