

The Influence of Parenting Styles on Feeding Practices



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1 of every 6 children in the US is obese¹

**In less than 2 decades,
42% of today's kids will be obese²**



¹Flegal, et al., JAMA, 2012

²Finkelstein, et al., Am J Prev Med, 2012

1 of 3 low-income children are obese or
overweight before age 5



Questions

To combat this complex problem:

- When should we intervene?
- And at what level(s)?

Why target the first 1000 days (conception to age 2) to prevent obesity?

- Infants and toddlers don't tend to "grow out of it"
- Obesity interventions later in life* have limited success
- Dietary patterns are established early in life, age 2 yrs
- **Experimental studies suggest promising strategies for early obesity prevention**

*Summerbell et al Cochrane review, 2005 ;Harris et al, 2009; Haynos & O'Donohue, 2012

Modifiable factors* affecting fetal growth, infant birth weight, postnatal weight gain and obesity

- Intergenerational transmission: prenatal
 - Maternal pre-pregnancy weight
 - Gestational weight gain
 - Prenatal eating and physical activity environment
 - Sleep
- Factors affecting rapid growth: postnatal
 - Formula feeding a risk factor
 - Transition to solids, table foods
 - Sleep duration
 - Traditional feeding practices
- Individual differences (maternal/child)

*Brisbois, Farmer, & McCargar, Obesity 2012; Weng et al. 2012 Arch Dis Child; Paul, et al 2009 Advances in Pediatrics

A period of dramatic shifts in feeding

Birth – 12 m



Assisted feeding
Schedule/demand



Hunger signs
Fullness signs

1 - 3 y



Self-feeding
Adult-like meal/snack patterns
Mimic unhealthy diet of adults

Morris, Rogers, Taper, *Nutrition Behav*, 1983; Paul, Dittrichova, *Czechoslov Med*, 1989; Hodges, Hughes, Hokinson, Fisher, 2007



Feeding practices can have negative impacts on intake regulation



Evidence from parenting literature may yield insights

“Early scholars defined control in terms of pressure, intrusiveness, and domination, viewing it as detrimental to children. At the same time, however, they acknowledged that it was also maladaptive for parents to allow children free rein, as children require some guidance.”¹

Control

Psychological Control:

- Pressure
- Intrusiveness
- Dominance



Vs.



Structure

Behavioral Control:

- Routines
- Guidance
- Limit setting

¹Grolnick & Pomerantz, *Child Devel Pers*, 2009

Responsive parenting

- Defined as a mother's/caregiver's prompt, contingent and appropriate interaction with the child

Why target responsive parenting?

- Language development
- Attachment
- Emotional growth
- Social competence
- School readiness
- Weight status



Lamb, Easterbrook, *Infant social cognition: Empirical and theoretical considerations*, 1981; Ainsworth, Bell, *Stimulation in early infancy*, 1969; Eshel et al. *Bull World Health Organ.* 2006

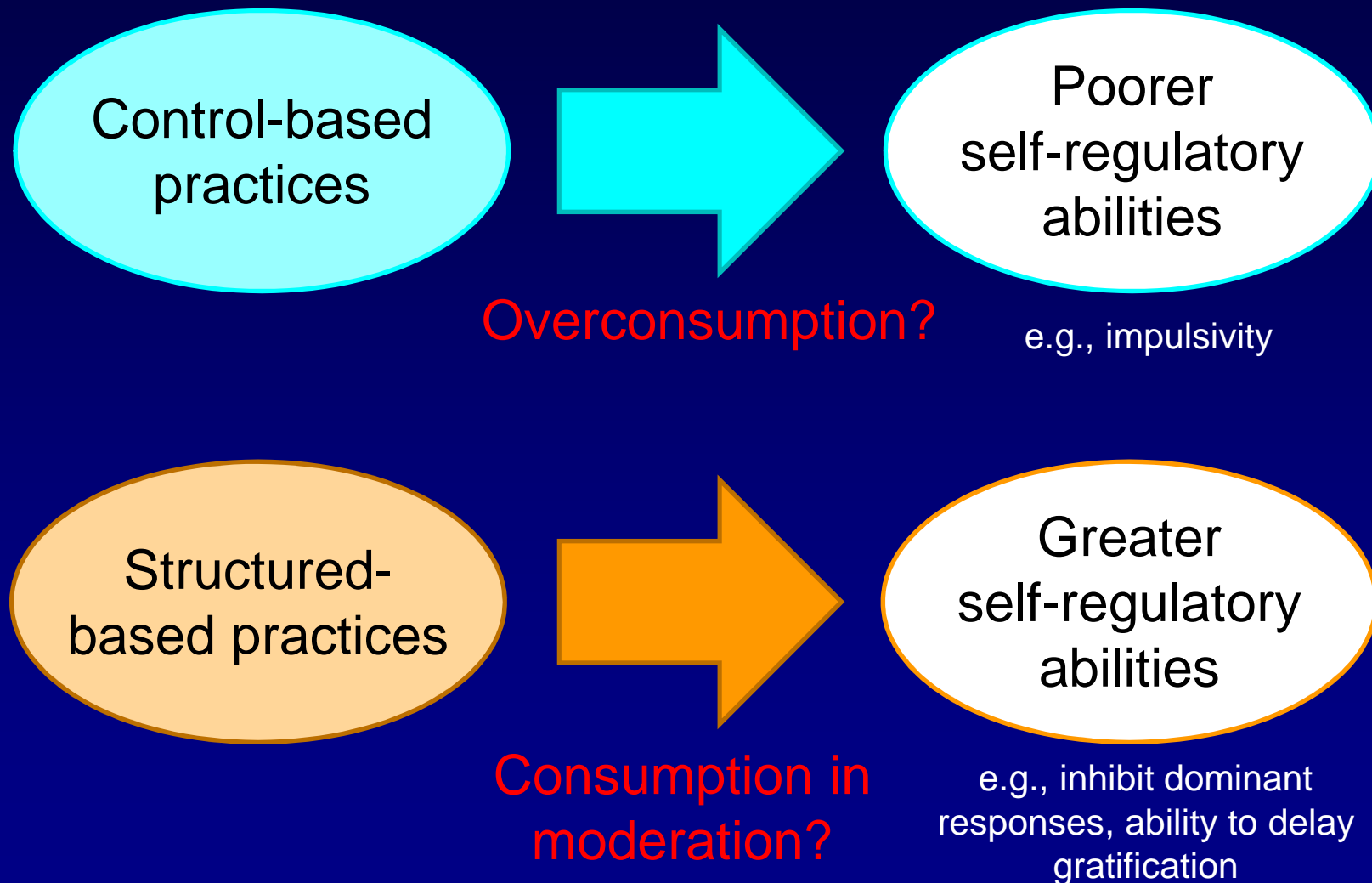
Self-regulation

- Self-regulation of energy intake refers to children's ability to eat and not eat in response to cues of hunger and satiety (i.e., eat when hungry and stop when full).
 - Children with lower self-regulatory abilities (i.e., eat in the absence of hunger) tend to consume more snack foods.
 - Lower self-regulation is also linked to excessive weight gain during middle childhood.



(Riggs, et al., Nutr Educ & Behav, 2010; Francis & Susman, JAMA, 2009)

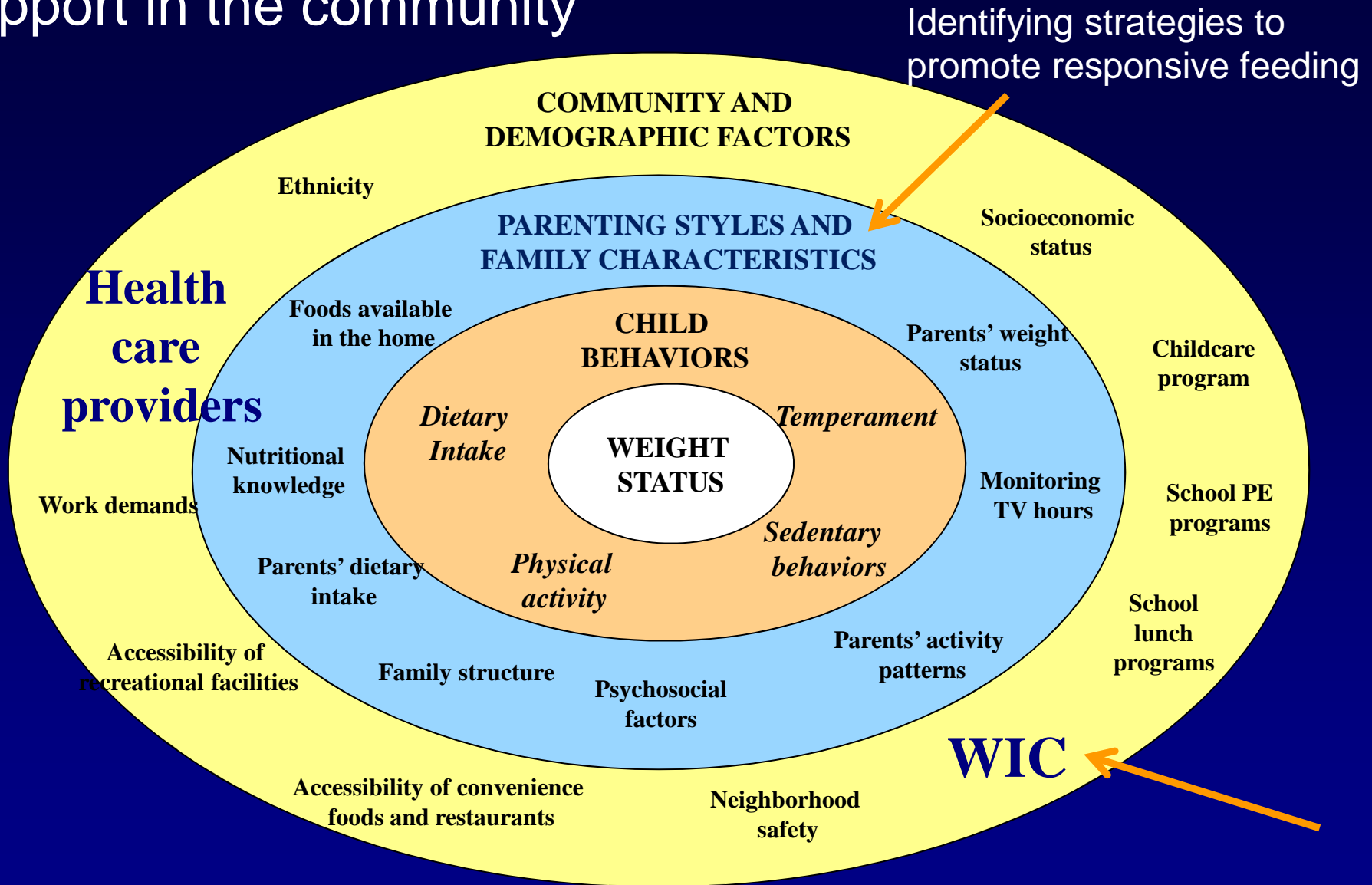
Structure-based practices may be a good thing!



(Marbell et al., *Motivation and Emotion*, 2012; Karreman et al., *Infant and Child Development*, 2006)

At what levels should we
intervene...

Ecological model: Reach parents using existing support in the community



To Successfully Intervene...

- Research Idea



- Basic and clinical research

- Development of science based program

- Program evaluation in controlled settings

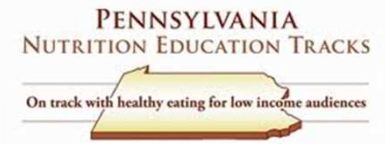


- Implement programs in the population

Design programs:

- Around the needs/interests of families
- That are sustainable (i.e., can go to scale/translate to community settings)

Feeding and Caring for Infants and Toddlers Project



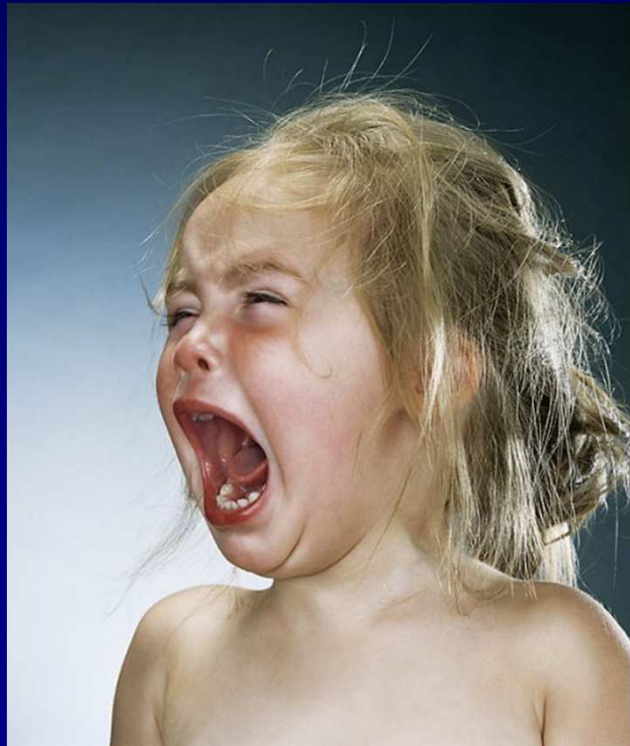
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In our “obesogenic” environment, why do some, but not all, children become obese?

Individual differences on child and maternal characteristics may increase or decrease an individual's susceptibility to obesity



Child's temperament – an individual's relatively stable “behavioral style”

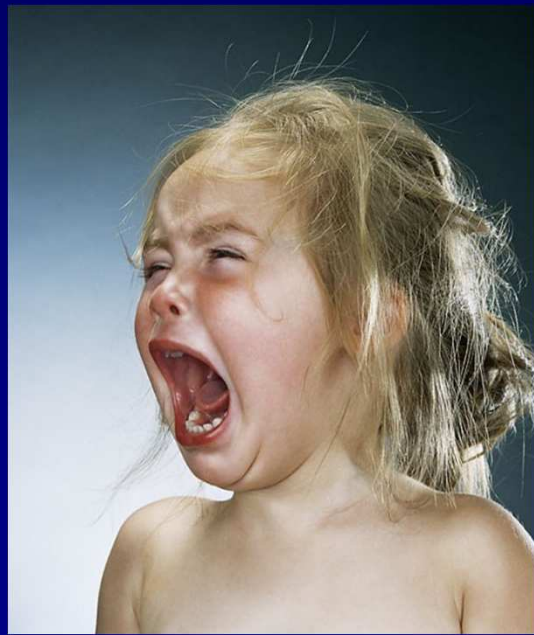
- Negativity or reactivity (e.g., more easily distressed, less soothable) is positively associated with subsequent weight status in most studies.

(Anzman-Frasca et al., review, 2012, Pryor et al. 2011)

- Effortful control or self-regulation (the ability to inhibit more automatic, dominant responses and activate an alternative, sub-dominant response) tends to be inversely associated with obesity risk (Anzman-Frasca et al., review, 2012)

Temperament – an individual’s “behavioral style”

- Parenting may moderate the association between negativity and obesity
 - Parenting practices (Stifter et al. 2011)
 - Parenting style (Wu et al, 2011)



Responsiveness and maternal characteristics

- Depression rates are high among low-income mothers (40-59%)
- An estimated 1 on 10 children experience a depressed mother in any given year
- Only about half report receiving services aimed at treating their depression

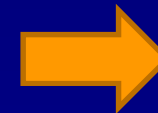
WHO. Depression. 2012; Erkel et al., *J Womens Health*, 2011; Adler et al., *Am Psychol*, 1994; Mayberry et al., *J Obstet Gynecol Neonatal Nurs*, 2007

Maternal psychosocial factors (e.g., depression) may also influence feeding behavior and child weight

- Some evidence shows that depressed mothers are:
 - Less sensitive and more negating to their children (*Murray et al. 1996*)
 - More likely to endorse a non-responsive feeding style (*Hurley et al., 2008*) and tend to overfeed their children (*Gross et al. 2013*)



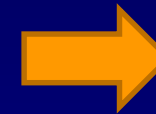
X



The parenting literature suggests that structure-based practices may be a good thing!



X



Structure

Behavioral Control:

- Routines
- Guidance
- Limit setting

¹Grolnick & Pomerantz, *Child Devel Pers*, 2009; (Marbell et al., *Motivation and Emotion*, 2012; Karreman et al., *Infant and Child Development*, 2006)

Research Aims

- Describe toddler temperament, maternal psychosocial factors, and parent feeding practices among mothers participating in the WIC program.
- Examine how maternal depression and toddler temperament impact the use of food/beverages to soothe and structured-based feeding practices.

Study design and participants

- Participants: 236 mothers enrolled in the Women, Infants, and Children Program in Pennsylvania
- Eligibility:
 - Child between the age of 12 and 36 months
 - English speaking
 - 18 years or older
- Design:
 - Survey distributed from 18 clinics throughout Pennsylvania
 - Participants returned surveys in self-addressed envelope
 - \$25 gift card

Measures

- **Maternal Body Mass Index:** Self-report weight and height
- **Toddler negativity (reactivity) and effortful control (self-regulation)**
 - Early Childhood Behavior Questionnaire-very short form (ECBQ-VSF)
 - Abbreviated from ECBQ (Putnam, 2006)
- **Maternal depression**
 - Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977)
- **Maternal anxiety specific to toddler distress** (Author developed)
 - 14 items; alpha = 0.91
 - e.g. item: “I feel anxious (or it bothers me a lot) when my child cries/fusses”; “I feel nervous and restless when my child cries or fusses when we are in public”
- **Maternal Feeding Behavior**
 - Babies Basic Needs Questionnaire (BBN): Food/beverage to soothe or manage behavior (Stifter, 2011)
 - Toddler Responsive Feeding Questionnaire (Author developed)

Sample Socio-Demographics

- Maternal characteristics
 - 73% White-Caucasian
 - 40% married; 21% lived with a grandparent
 - 51% high school education or less
 - 44% unemployed; 22% employed full-time
 - 70% overweight or obese; 44% obese
 - 29% clinically depressed
- Toddler characteristics
 - 63% White-Caucasian
 - Mean age = 1.89 years
 - 36% overweight: BMI percentile ≥ 85

Maternal and child characteristics associated with maternal feeding practices among toddlers (n = 236)

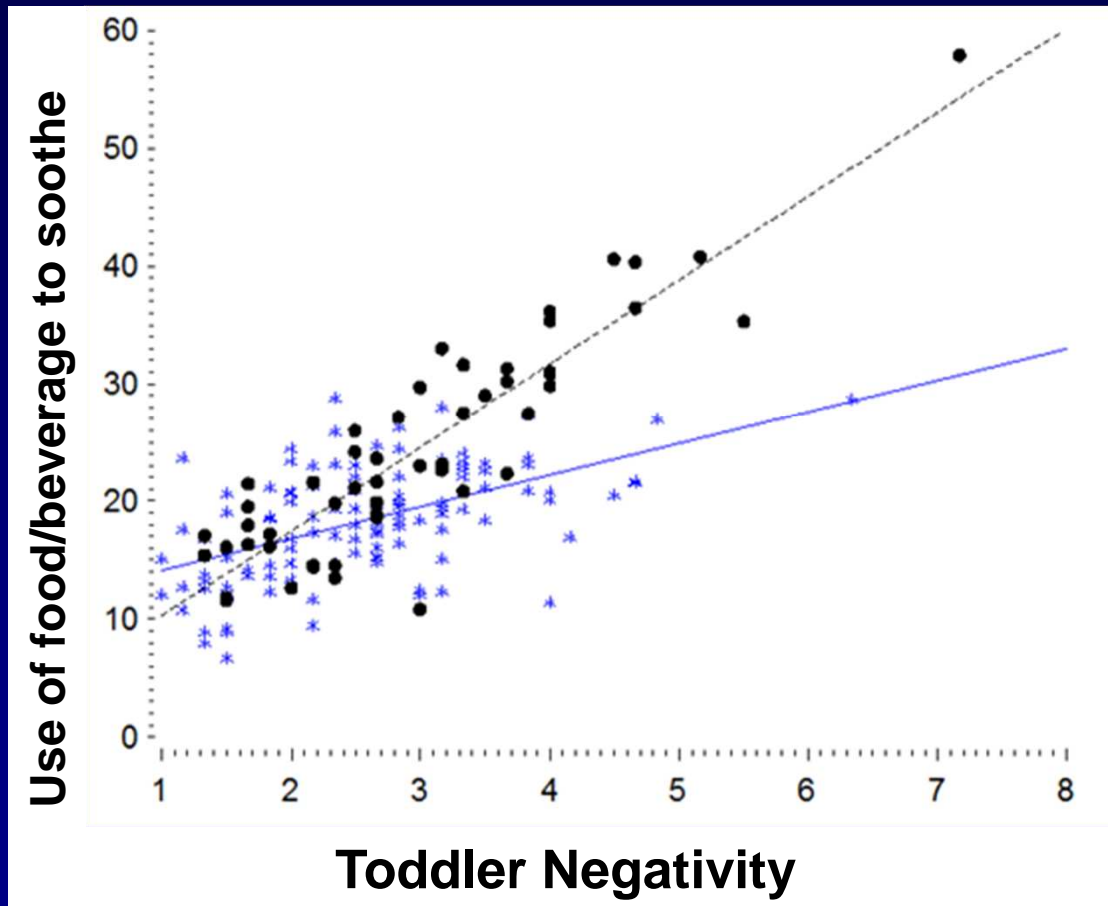
	Structure-based feeding	Food to soothe / manage distress
Food to soothe	- 0.37****	
Negativity (reactivity)	- 0.23***	0.34****
Effortful control (self-regulation)	0.20**	- 0.36 ****
Depression	- 0.19**	0.22**
Anxiety related to toddler distress	- 0.17**	0.42****
Turn TV/radio on in response to toddler distress	- 0.18**	0.20**

* p<0.05; ** p<0.01; *** p<0.001; **** p<0.0001

Maternal and toddler characteristics differ by maternal depression status (n = 236)

	Not-Depressed (n=131)	Depressed (n=53)	p <
Toddler negativity (reactivity)	3.11	3.50	0.01
Toddler effortful control (self-regulation)	5.09	4.92	NS
Maternal anxiety to toddler distress	1.49	1.90	0.0001
Food to soothe	18.37	24.02	0.01
Structured-based feeding	2.80	2.51	0.001
Maternal BMI	28.9	30.9	p = 0.1

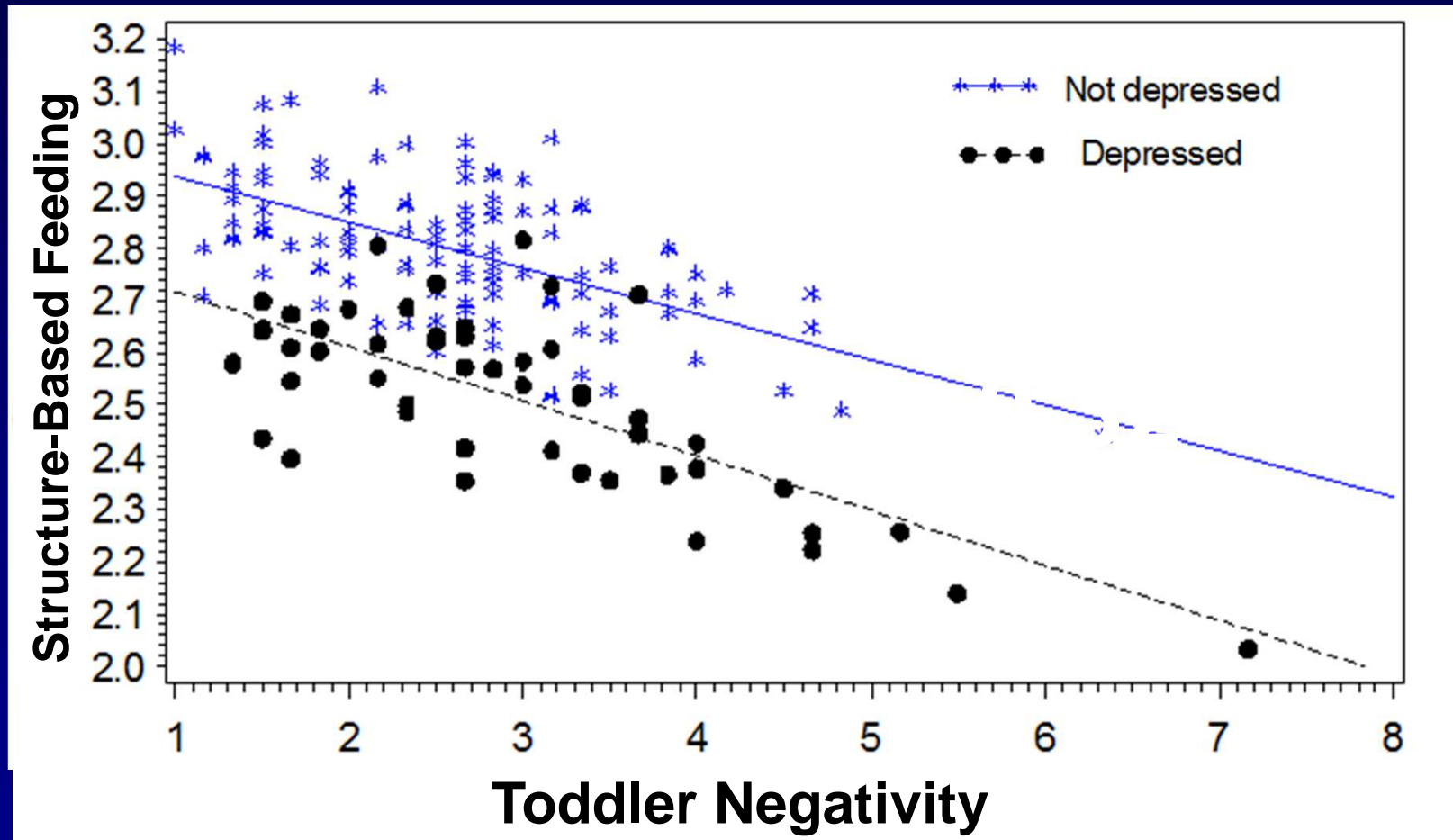
Association between toddler negativity and use of food/beverage to soothe is stronger among depressed compared to not-depressed mothers



$R^2 = 0.17$

Covariates: Maternal BMI, education, employment, marital status

The association between structure-based feeding and toddler negativity did not differ by maternal depression status



Covariates: Maternal BMI, education, employment, marital status

Conclusions

- Depression was relatively high among this sample of WIC mothers.
- Negative toddlers may be at increased risk for non-responsive feeding practices such as the use of food to soothe.
- This risk may be even higher among toddlers with depressed mothers.
- Mothers who expose their toddlers to more structure-based feeding practices tend to be less depressed and perceive their toddler to be less negative.

Starting early: Building an effective parenting intervention to prevent childhood obesity among low income families

Phase 1: Formative Research

Use a mixed methods approach to examine factors impacting on parents and families that are relevant for intervention design.

Mother inclusion criteria:

- Age > 18 years
 - Have a child < 2 years of age
 - Fluent in English and enrolled in PA WIC
-
- 60 women from Central PA WIC clinics
 - 77% White
 - 33% had education beyond high school
 - 50% unemployed; 55% food insecure
 - 71% pre-pregnant overweight or obese
 - 37% depressed

The majority of mothers reported using non-responsive, controlling feeding practices

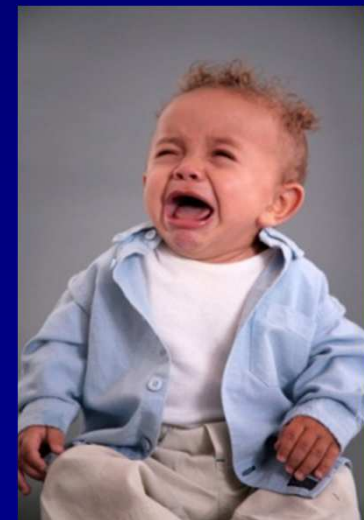
- 68% of mothers put cereal in the bottle
- 49% used beverages to calm their baby
- 48% put their baby to bed/nap with a bottle
- 84% reported encouraging their baby to finish the bottle

Maternal and child sleep is problematic*

- 49% of mothers did not get enough sleep in the past month
- 44% of mothers had problems settling/quieting their infant/toddler at least one night a week

Maternal feeding practices were related to depression and infant/toddler negativity

- Infant/toddler negativity was positively associated with parent use of food to soothe ($r = 0.29$, $p < 0.05$), although effects differed, depending on maternal depression
- Clinically depressed mothers reported (37%)
 - greater infant negativity
 - lower responsive feeding scores



Focus groups revealed that ...

Some mothers disliked the rigidity of nutrition education messages provided by the WIC program

“I feel like they [WIC] are so old school. If you don't do it this way you are wrong and they try to boot you off of the program if you are telling them you are doing something different. They are like you don't need our help.”

Receive conflicting information from WIC, health care providers and their own families

“I mean WIC tells you to hold off on feeding. My pediatrician told me to start at four months. I ground up fettuccini alfredo and she ate that at four months.”



vs



Think “every baby is different” and “I know best” when making decisions about feeding and caring for their infant or toddler

“I am not going to tell him no. Today he had like four of them [juice] already. I don’t mean to be disrespectful, but maybe he is different from other children, he needs the juice.”

“Ah, I really don’t know [portion sizes]. I just do the mom thing and go by instinct, but that is really how I do a lot of things. I just go by my intuition you know.”

Phase II: Pilot Technology



Phase 1: Formative Research

Use a mixed methods approach to examine factors impacting on parents and families that are relevant for intervention design.



Phase 2: Pilot technology

Test the feasibility of using mobile telephones to:

1. Deliver a video message intervention
2. Collect ecological momentary assessment data

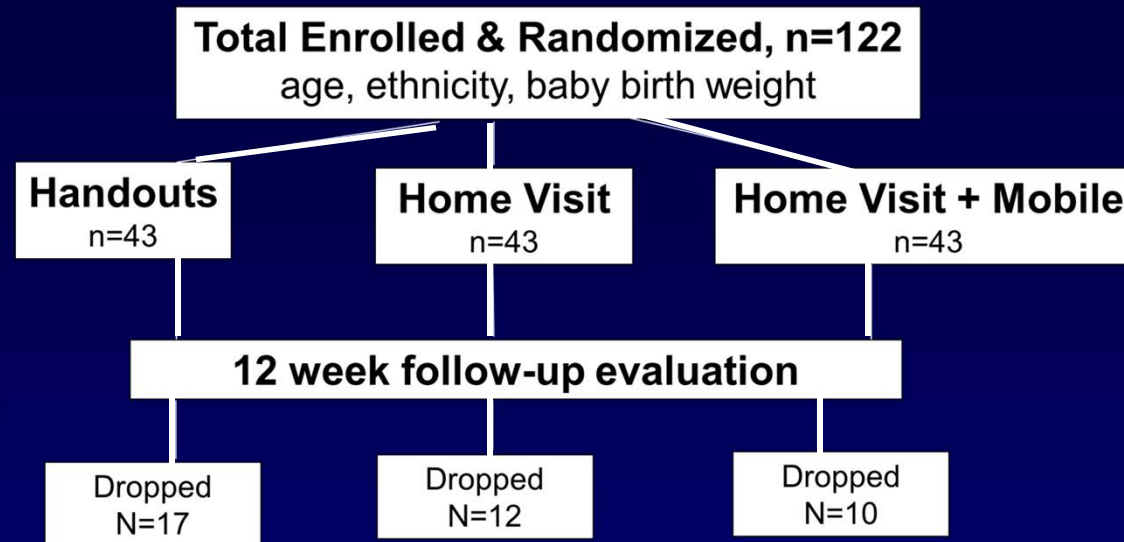
Savage et al. Publication in preparation. Prev. Med.

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NUTRITION EDUCATION TRACKS

On track with healthy eating for low income audiences



Design:



Responsive feeding messages:

- Hunger and fullness signs
- Use of bottle and cup
- Portion size
- Age appropriate foods
- Parents as models
- Division of feeding responsibility
- Repeated exposure
- Feeding practices
- Parenting styles
- Parents as models

Results

Among those in the Home Visit + Mobile Messaging Condition

- 2/3 reported viewing the video messages
- 84% of those who viewed reported intent to use the information

Compared to mothers in the handout only group, mothers randomized to the Home Visit + Mobile Messaging used:

- Less food to soothe or manage behavior ($p < 0.01$)
- Less pressuring feeding style ($p < 0.01$)
- More responsive feeding style ($p < 0.0001$)

Mobile telephones can be used to deliver information and collect data among this sample of women

Using smartphones to deliver education

- 67% owned a phone with unlimited text plans
- “What would be your preferred method to receive education from WIC?”
 - 38% - A combination of both in-person and text/video messages
 - 57% - Text/video messages
 - 5% - In-person counseling



Phase III: Pilot Intervention Using MOST

Multiple Optimization Strategy

Phase 1: Formative Research

Use a mixed methods approach to examine factors impacting on parents and families that are relevant for intervention design.

Phase 2: Pilot technology

Test the feasibility of using technology (smartphones) to deliver and evaluate a responsive feeding intervention

Phase 3: Pilot intervention

Use a fractional factorial study design to assess the feasibility of delivering an intervention to low-income mothers.

Funding:
KL2TR000126

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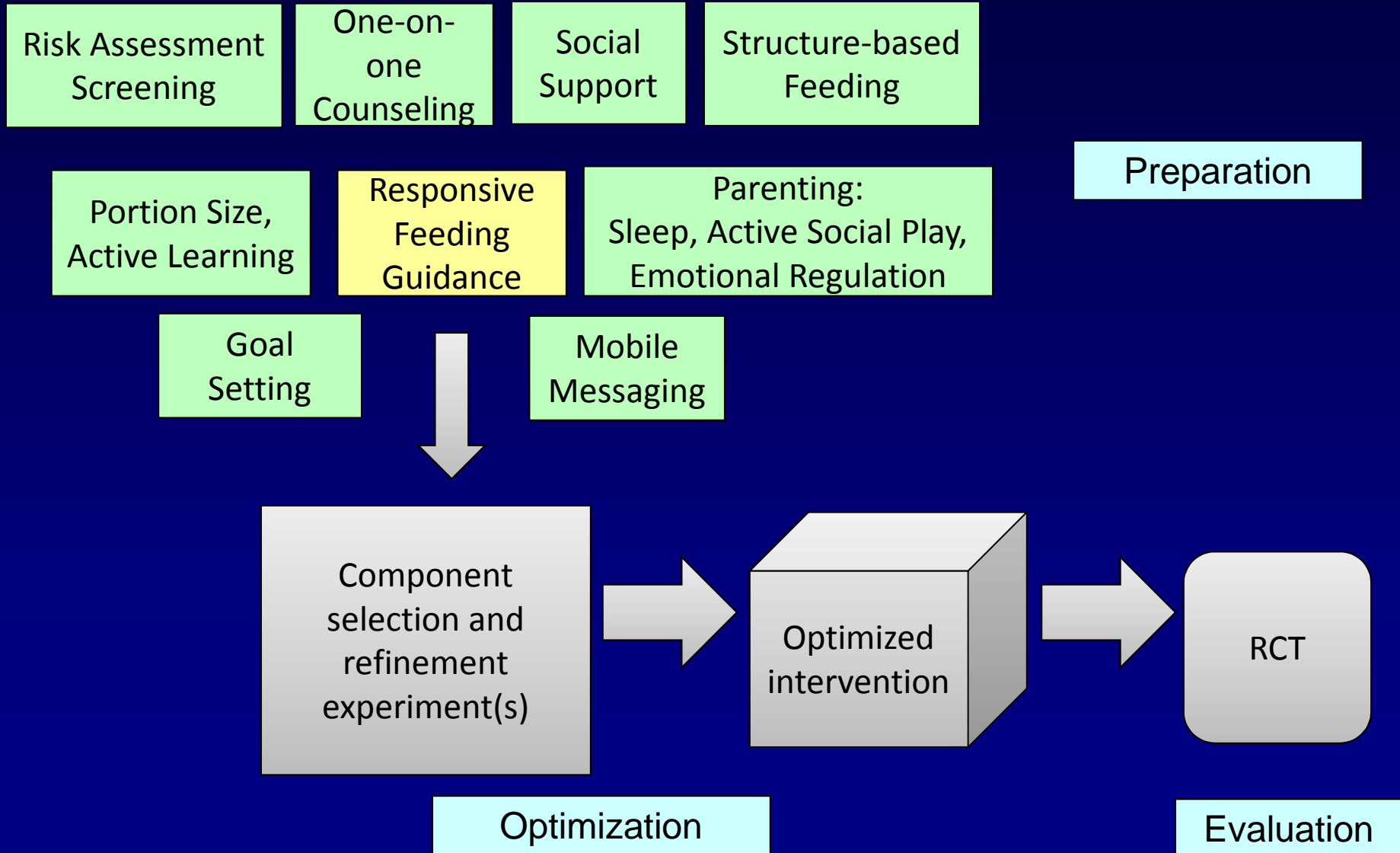
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Research Aim

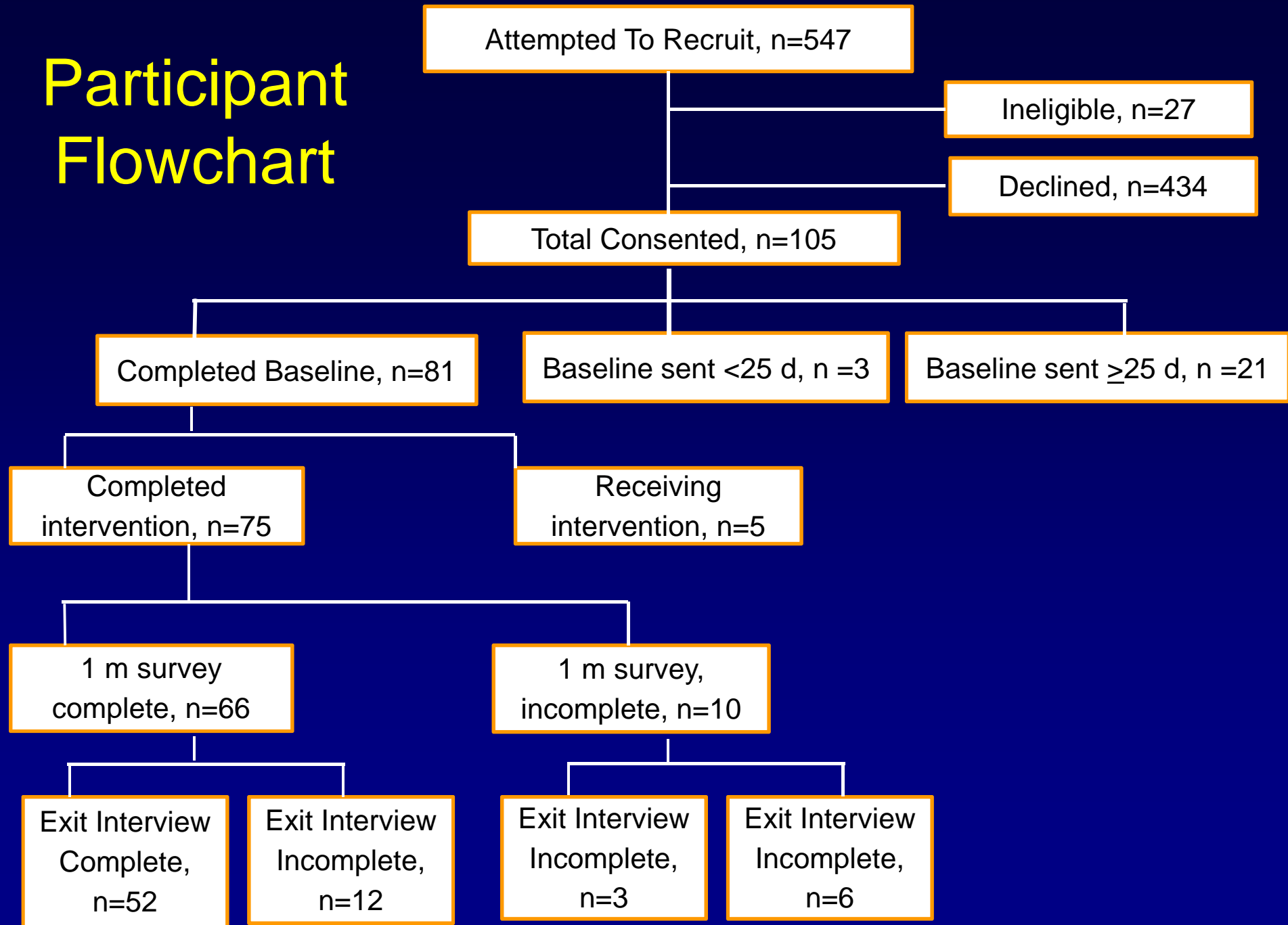
- Can we deliver multiple intervention components designed to promote responsive feeding?
- These data will be used to build a highly effective behavioral intervention to promote responsive parenting using the Multiphase Optimization Strategy (MOST).



Methods



Participant Flowchart



Preliminary Results

- Phone calls
 - Attempts to contact participant for scheduled call: M= 2; range 1 to 5
 - 93% (64/72) completed 1st phone call
 - 81% (47/58) completed 2nd phone call
 - 86% (18/21) reported that the phone call to discuss responsive feeding materials were very useful or useful.
- Mobile message booster
 - 24% (20/82) of participants did not have reliable smart-phone service and thus were sent video links via email

Preliminary Results: Components

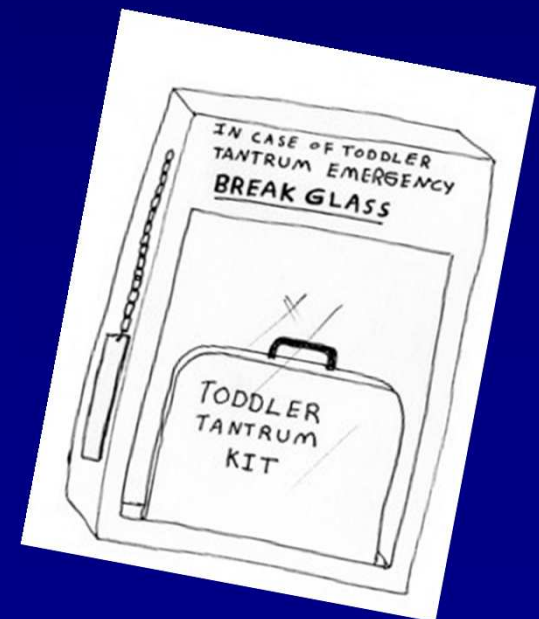
- Portion size
 - 92% of mothers reported using the portion size plate
 - Among those, 35% and 50% reported using it everyday or 2-3/week, respectively
 - 38% reported that the measuring cups/spoons did not change the amount of food they gave their toddlers

Preliminary Results: Components

- Support person component
 - 29% (11/38) of the support people returned their contact information AND wanted to be contacted
- Goal setting:
 - 81% liked setting goals around responsive feeding
- General feedback:
 - 76.5% (13/17) reported following our suggestions, making a change in their feeding practices at home

Implications to future research

- To encourage responsive feeding/parenting and prevent early childhood obesity, nutrition education may need to be individually tailored to address maternal mental health and perceptions of toddler temperament.



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- The Children, Youth, & Families Consortium at the Pennsylvania State University.



Thank you! Question?

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Structure vs. control in the feeding domain

Overt

Firm control perceived by the child



Unhealthy

Dietary
intake

Healthy

Covert

Structuring the environment to provide healthy options

