ECOLOGICAL MOMENTARY ASSESSMENT: A TOOL FOR SOCIAL EPIDEMIOLOGY

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The Science of Real-Time Data Capture: Self-Reports in Health Research Conference
September 6, 2003

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This study was funded by NHLBI Grant HL56346.

PSYCHOSOCIAL FACTORS AND DISEASE RISK

- Job Stress
- Low Social Support
- Hostility, Depression

Questionnaires, interviews

vs. EMA methods

WHY USE EMA AS A TOOL FOR SOCIAL EPIDEMIOLOGY?

- **The importance of psychosocial characteristics may vary as a function of frequency, duration of daily exposure.**

  - Retrospective questionnaires require use of estimation heuristics that may be inaccurate, biased .

  - Momentary reports, sampled frequently throughout the day, should reduce measurement error.

WHY USE EMA AS A TOOL FOR SOCIAL EPIDEMIOLOGY?

- **Opportunity to explore some of the mechanisms by which psychosocial risk factors may contribute to disease.**

- Can link momentary self-reports, within-person, to relevant measures of biological function.

JOB STRAIN AND CARDIOVASCULAR DISEASE

PSYCHOLOGICAL DEMAND

DECISION LATITUDE

LO DEMAND HI CONTROL	HI DEMAND HI CONTROL
LO DEMAND LO CONTROL	HI DEMAND LO CONTROL

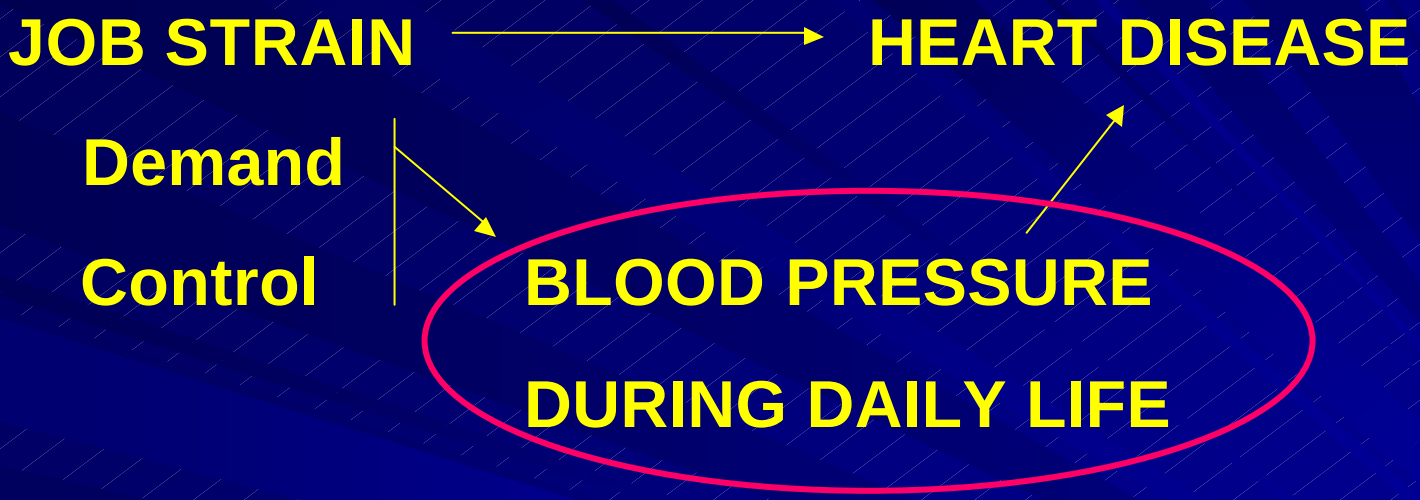
JOB STRAIN AND CARDIOVASCULAR DISEASE

PITTSBURGH HEALTHY HEART PROJECT

- Ongoing prospective epidemiological study
- Psychosocial characteristics
  - ® cardiovascular disease
- EMA assessments used to characterize the daily experiences of study participants, links with blood pressure changes during daily living.

PITTSBURGH HEALTHY HEART PROJECT

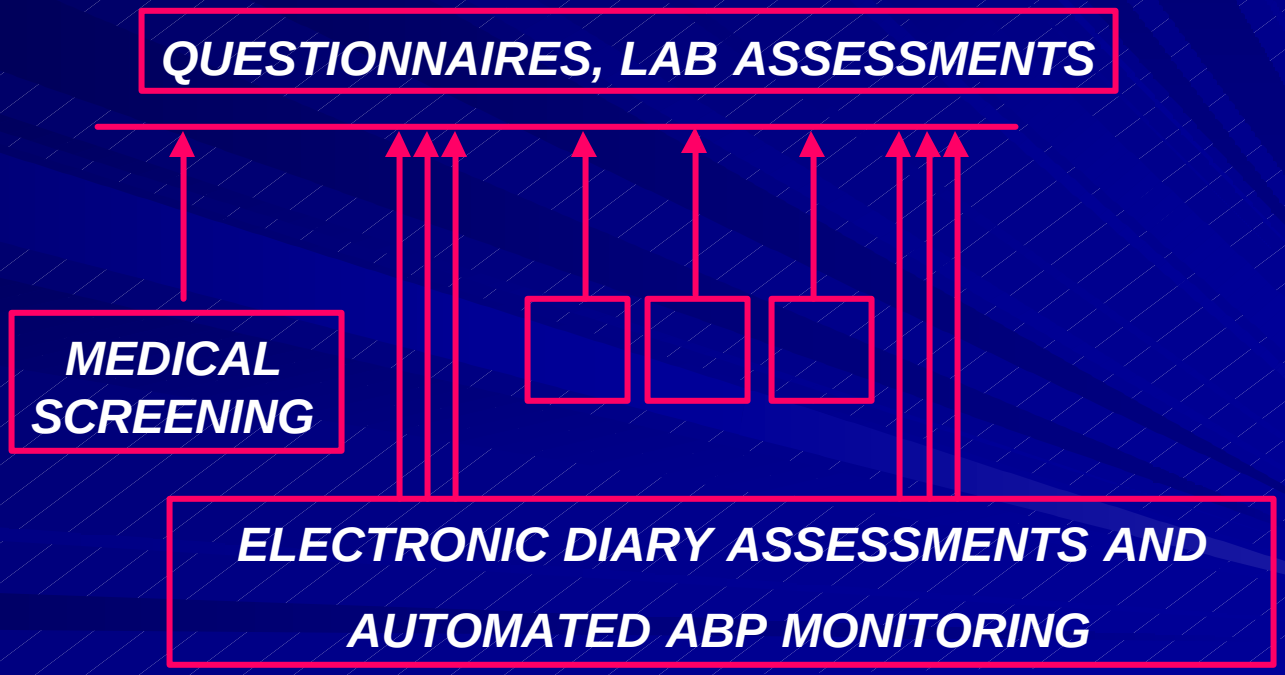
- **Atherosclerosis**
  - Ultrasound measurements visualize thickness of the artery walls as indicator of carotid artery atherosclerosis.



None of the previous work has examined the impact of ambulatory blood pressure (ABP) as a mediator of the effects of job strain on cardiovascular risk.

PITTSBURGH HEALTHY HEART PROJECT

N=337, ages 50-70, healthy



TASK DEMAND

Activity last 10 minutes

Required working hard?

NO==========YES

Required working fast?

NO==========YES

Juggled several tasks at once?

NO==========YES

DECISIONAL CONTROL

Activity last 10 minutes

Could change activity if you chose to?

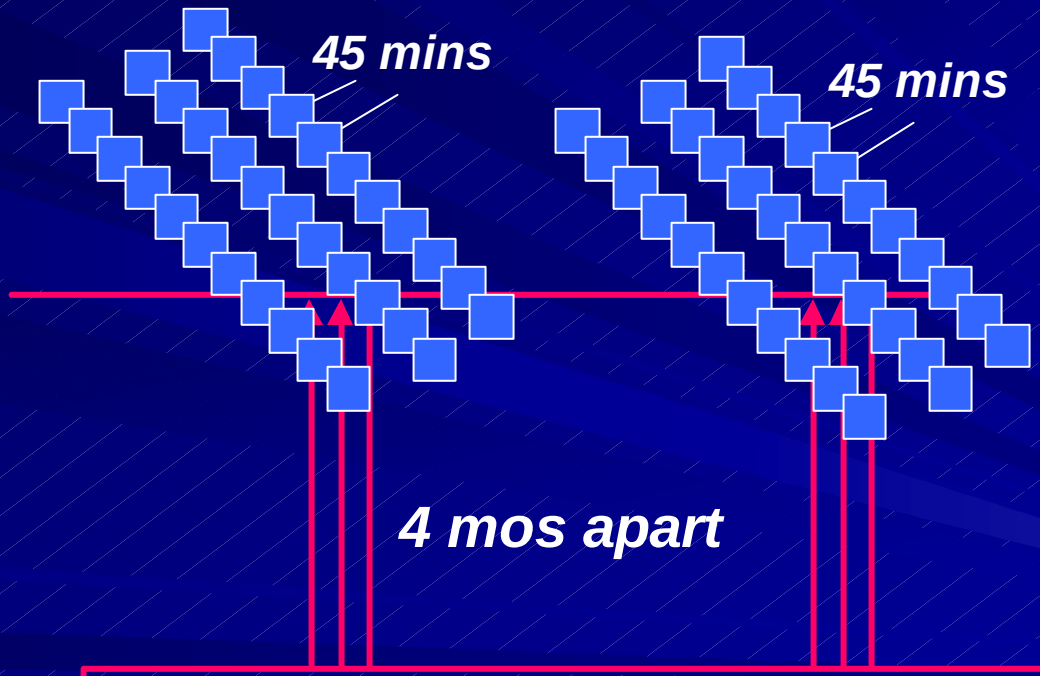
NO==========YES

Choice in scheduling this activity?

NO==========YES

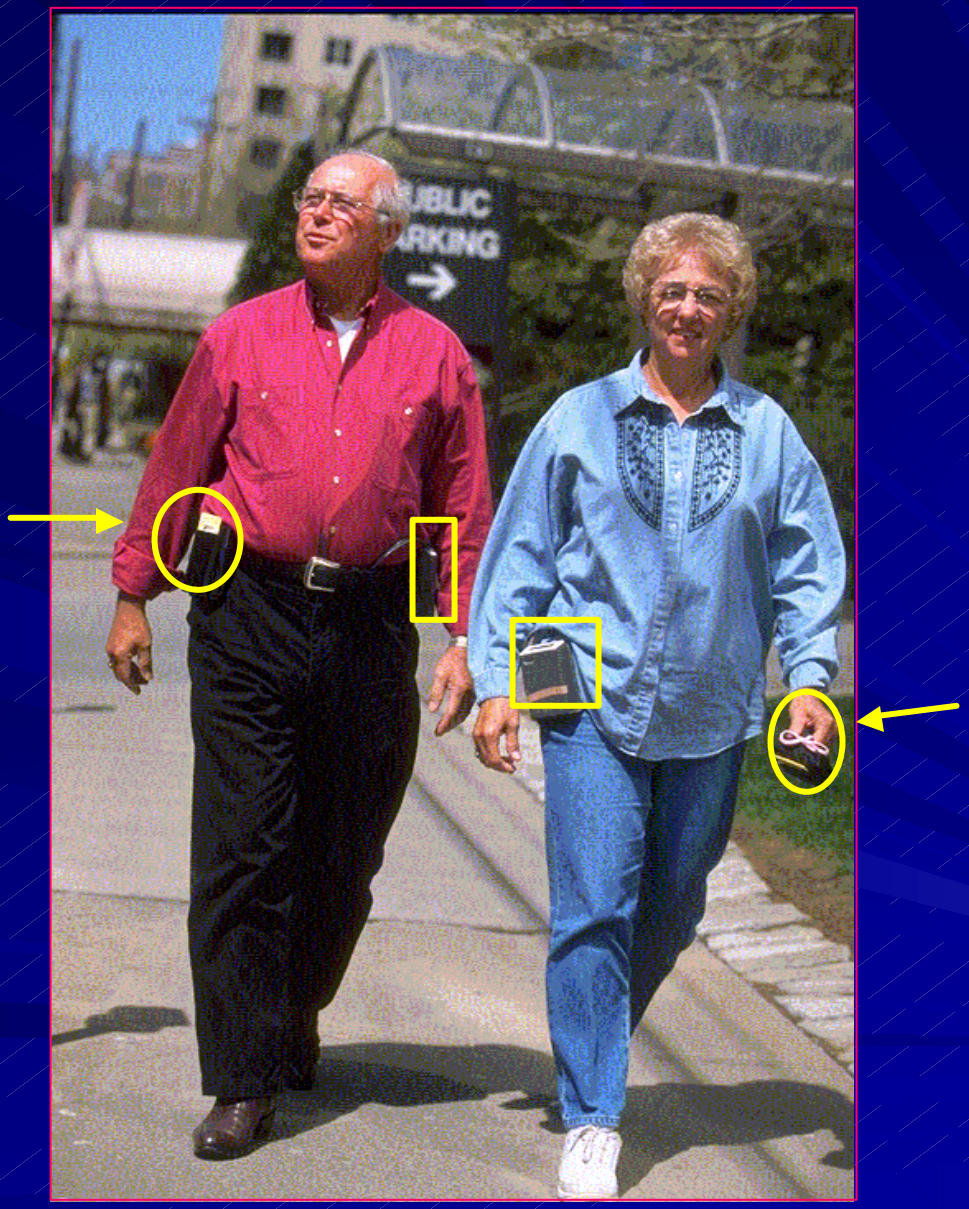
Adapted from Karasek Job Content Questionnaire

PITTSBURGH HEALTHY HEART PROJECT



ELECTRONIC DIARY ASSESSMENTS AND AUTOMATED ABP MONITORING

back
go



WHY DID WE USE AN ELECTRONIC DIARY?

Electronic diary responses are time-stamped.

- Allowed us to synchronize behavioral and physiological data.
- Ensured that questions were answered in a timely fashion.
- Allowed us to check on compliance.

The average participant completed interviews during 89 % of all possible 45-minute intervals during waking hours throughout the 6-day monitoring period.

DATA ANALYSES

CAROTID ATHEROSCLEROSIS

Conventional GLM approach.

AMBULATORY BLOOD PRESSURE ANALYSES

Multilevel modeling (SAS Proc Mixed).

-- Ability to handle time varying covariates.

--Ability to model autocorrelation effects.

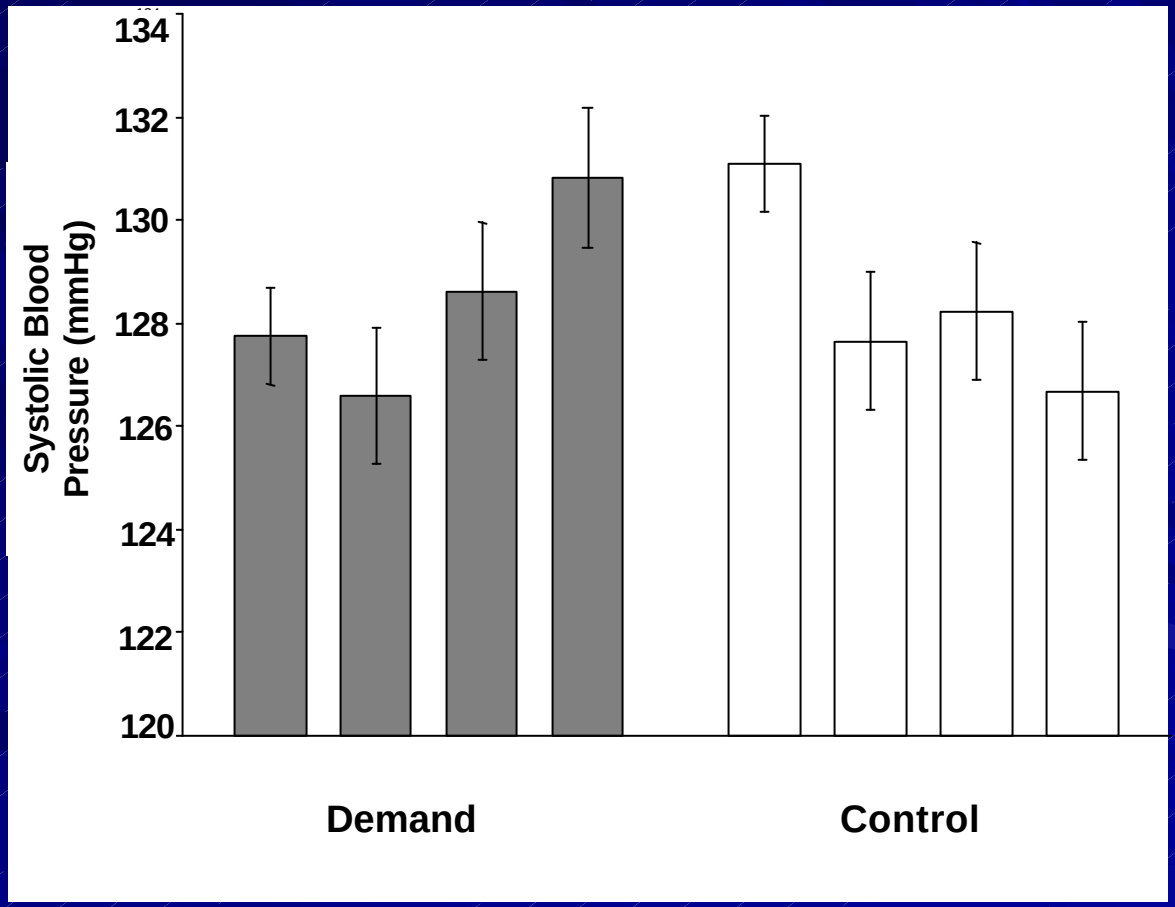
--Ability to tolerate unbalanced designs.

1. Are experiences of Demand and Control associated, within-person, with fluctuations in ambulatory blood pressure during daily life?

Posture, activity, and substance use as time-varying covariates

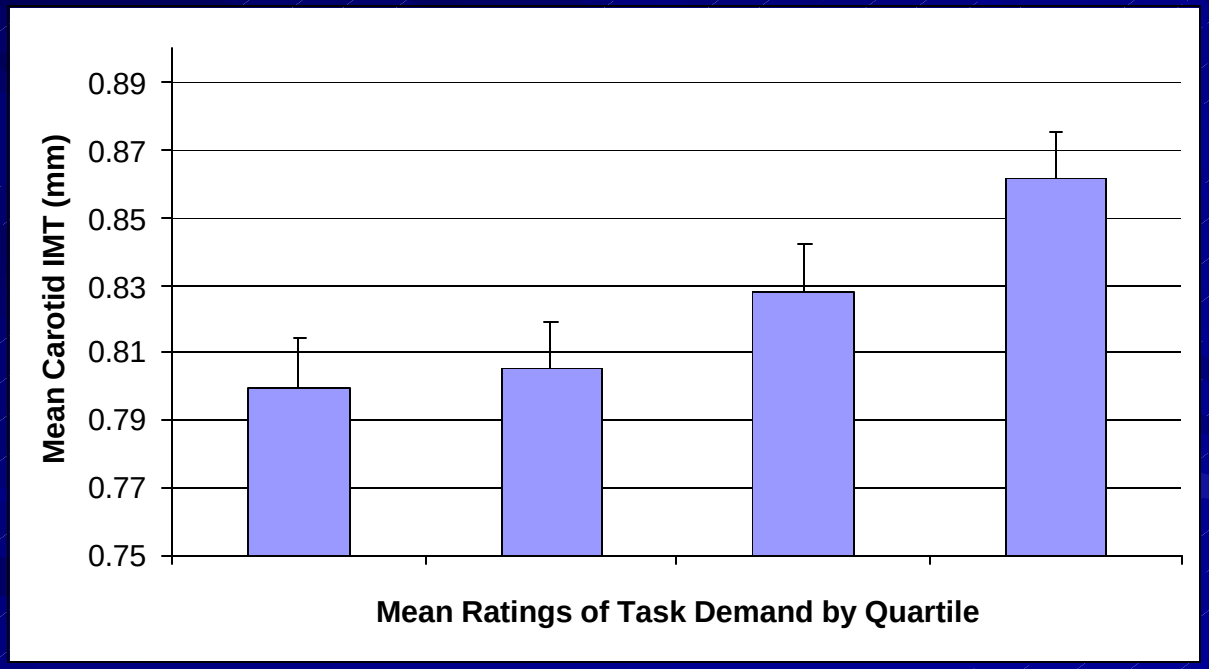
	Systolic Blood Pressure		
	b	t	p
Task Demand	.22	3.59	.0003
Decisional Control	-.10	2.28	.02

2. Are daily experiences of Demand and Control, between-person, associated with mean differences in ambulatory blood pressure?



3. Are daily experiences of Demand and Control related to carotid artery atherosclerosis?

b=.02, F (1, 328) = 8.44, r^2 = .02, p =.004



Kamarck et al. Health Psychology*: in press*

MEAN TASK DEMAND AND CAROTID ARTERY ATHEROSCLEROSIS

- **Task Demand ratings were associated with atherosclerosis even among those who were not employed during the study (n=141).**

(b=.02, p=.03, r2= .03).

- **Among employed Ss (n=152), association did not differ as a function of whether ratings were derived from inside or outside of the workplace.**

Work: (b=.02, p=.02, r^2= .03).

Nonwork: (b=.02, p=.05, r^2= .02).

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MEAN TASK DEMAND AND CAROTID ARTERY ATHEROSCLEROSIS

- **Scales from the Karasek Job Content Questionnaire were not significantly associated with atherosclerosis among the employed.**

- **No significant gender differences in the association between Task Demand and carotid atherosclerosis.**

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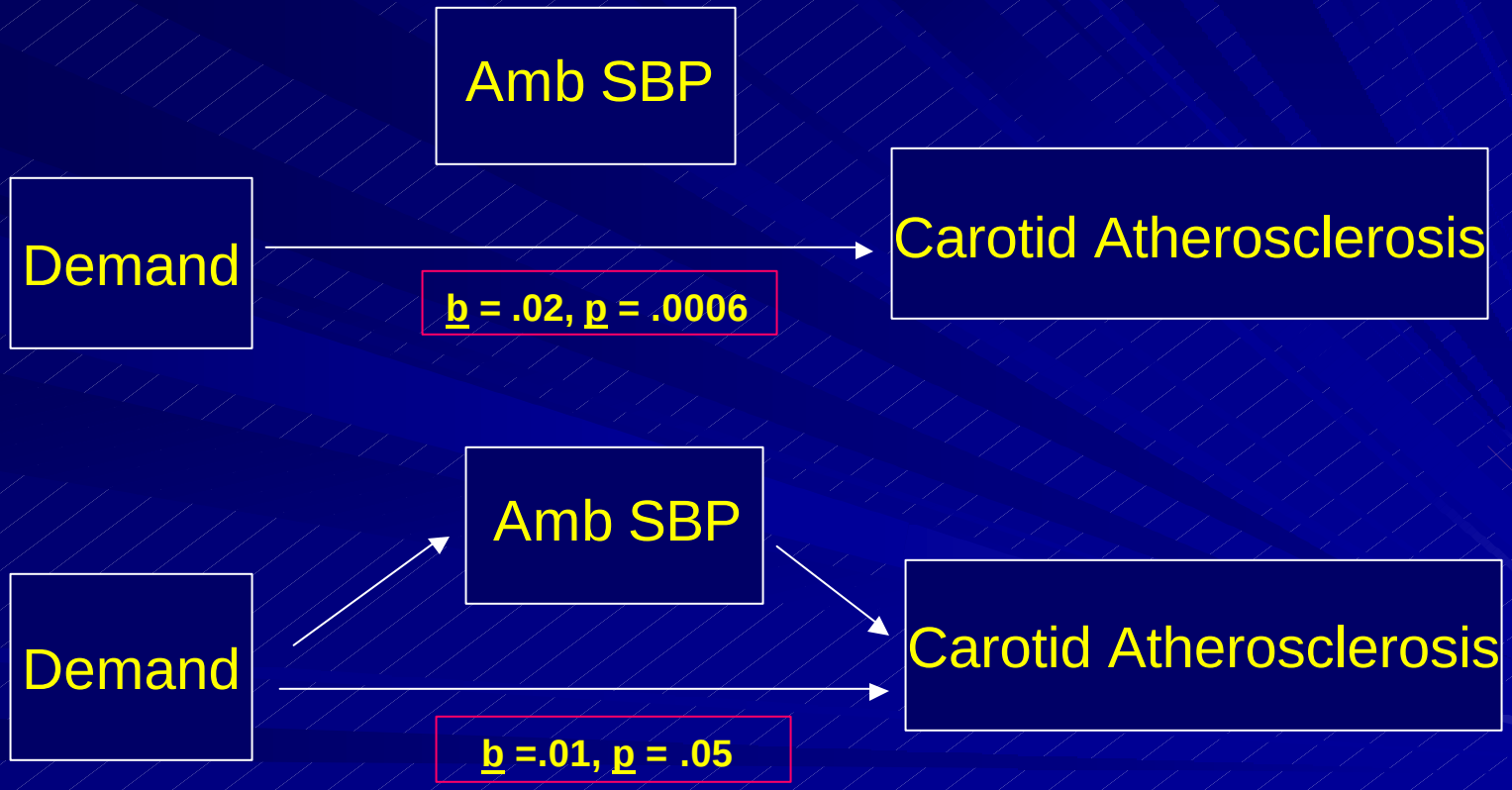
4. Does mean ambulatory blood pressure mediate any observed relationship between Demand/Control and carotid artery atherosclerosis?



CONTROLLING FOR DEMOGRAPHIC COVARIATES AND CLINIC PRESSURE, N=336

WHAT ARE THE LESSONS LEARNED FROM THESE FINDINGS?

1. We can collect multiple days of ambulatory blood pressure data on a large community-based sample.
2. Self-report and physiological data may be successfully linked using EMA methods, allowing us to examine some of the behavioral determinants of rapidly fluctuating physiological processes.
3. Our ability to obtain a representative sample of experience throughout daily life allows us to test important models of psychosocial risk and cardiovascular disease.

WHAT ARE THE LESSONS LEARNED FROM THESE FINDINGS?

4. Our data are partially consistent with the "job strain model," although they raise the possibility that previously observed associations may not be attributed solely to stress in the workplace.
5. It is possible that EMA assessments may capture the frequency and duration of effects more effectively than a measurement method that relies on retrospective self-report.
6. This is the first study examining ambulatory blood pressure as a mediator accounting for the relationship between Demand/Control and increased cardiovascular risk.

WHAT ARE SOME OF THE CHALLENGES INVOLVED IN THIS WORK?

1. EMA monitoring with ambulatory blood pressure involves a substantial effort for the participants.

   Strategies for streamlining data collection procedures should be investigated.

2. Challenges with respect to maintaining participant comfort during ambulatory blood pressure monitoring.

   e.g., Embedded microphones, breathable cuffs and bladders should be explored.

WHAT ARE SOME OF THE CHALLENGES INVOLVED IN THIS WORK?

3. These methods are time consuming for staff.

   Video-based training could be considered.

4. Concerns about generalizability.

   These methods exclude those whose routines cannot handle interruption.

5. Occasional technical difficulties.

   Increased integration between self-report and physiological data collection systems would be desirable.

CONCLUSION

- Logistics of EMA for use in social epidemiological research are initially daunting.
- We have developed a number of productive approaches which should yield us valuable fruit for our labors.
- These methods can provide valuable information about person-environment transactions not available from interviews or questionnaires.