



Methods for Measuring Park Environments

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NIEHS: Environmental Solutions to Obesity in America's Youth Conference
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“Environmental Characteristics of Recreational Areas”

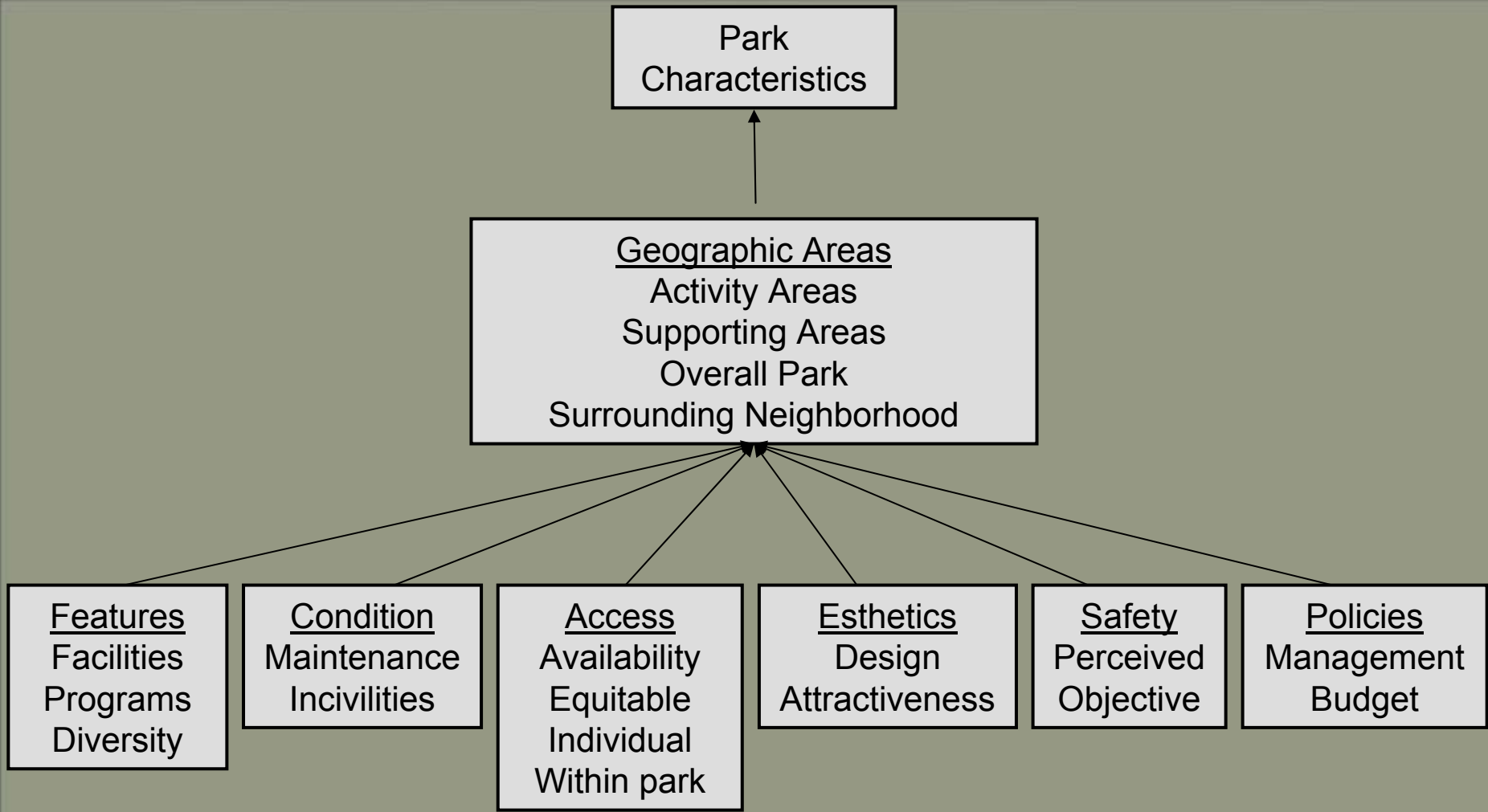
- Funded by the Active Living Research Program of the Robert Wood Johnson Foundation
- Develop objective measures of the physical characteristics of parks & public recreational areas that may be associated with physical activity



Methods

- Develop conceptual model
- Design instruments
- Test reliability & validity

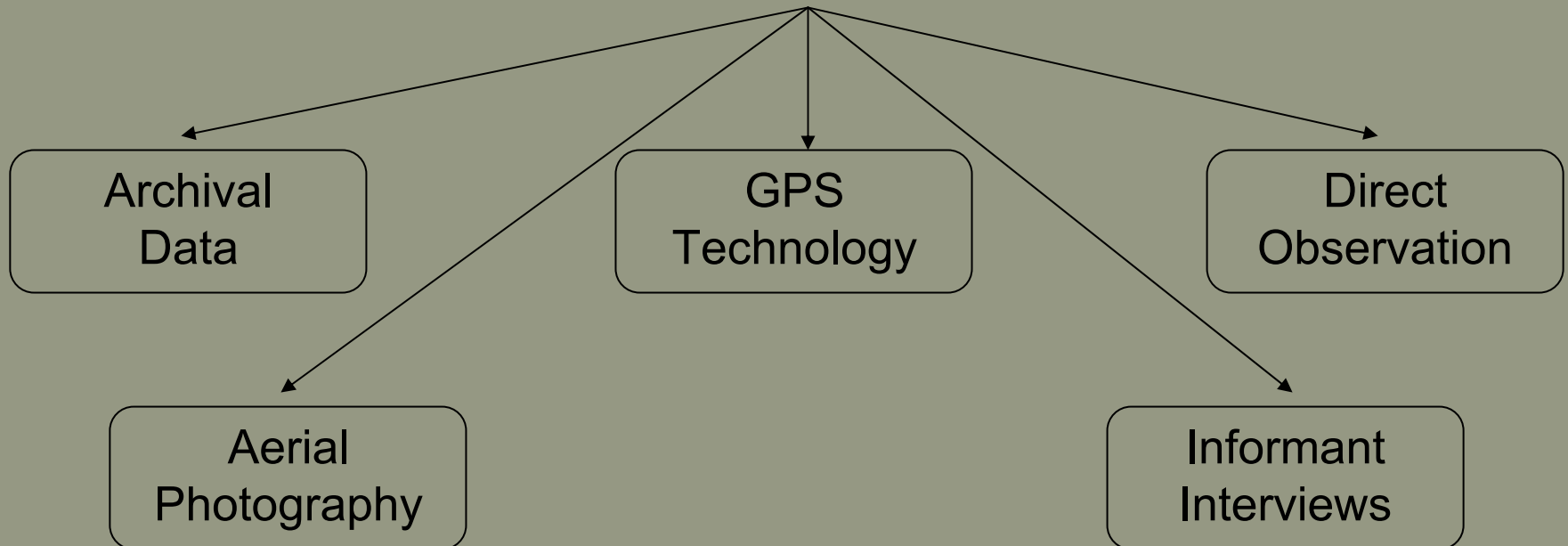
Conceptual Model



Bedimo-Rung et al, "The Significance of Parks to Physical Activity and Public Health: A Conceptual Model," AJPM, 2005:28(2S2):159-168

Instrument Design

BRAT (Bedimo-Rung Assessment Tools)



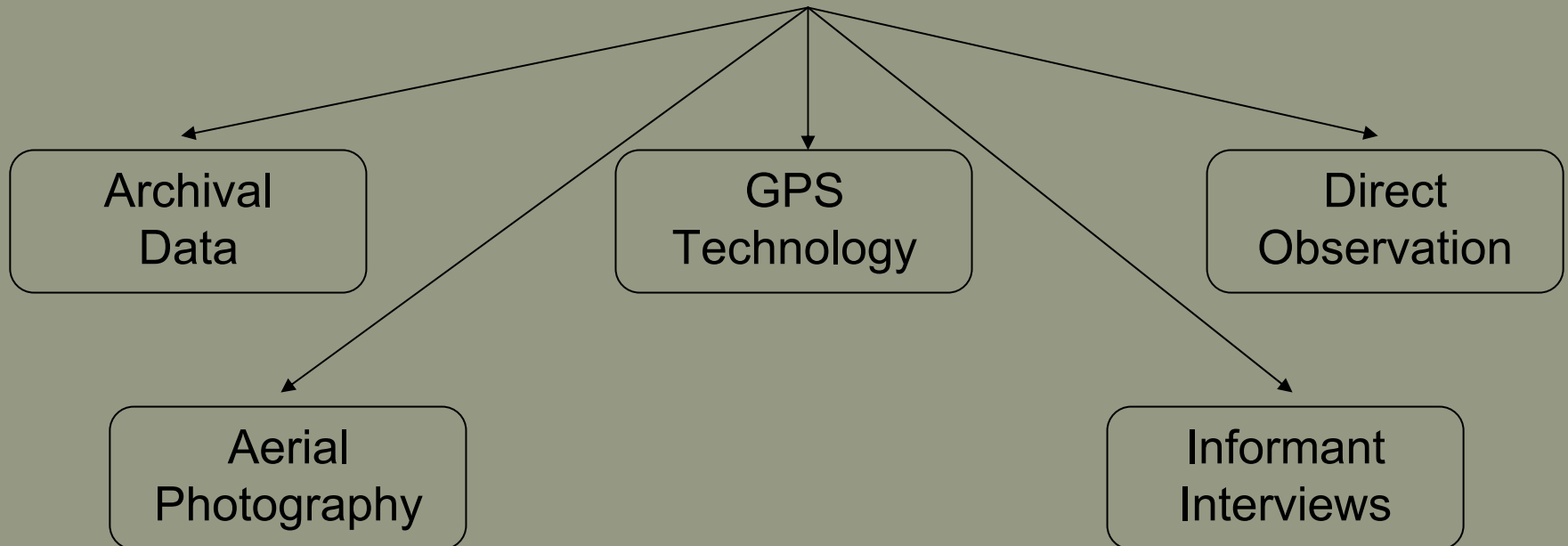


Archival Data

- Census data
- NOPD crime statistics
- Abandoned housing statistics
- Traffic data
- Weather

Instrument Design

BRAT (Bedimo-Rung Assessment Tools)

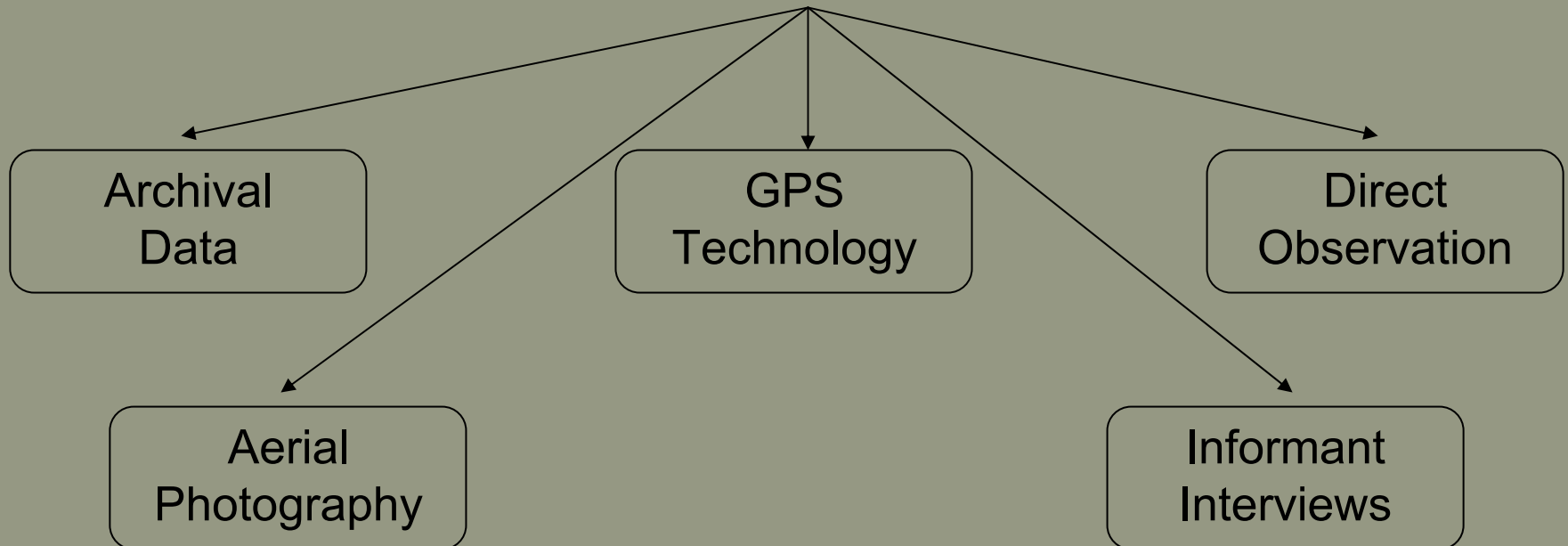


Aerial Photography



Instrument Design

BRAT (Bedimo-Rung Assessment Tools)

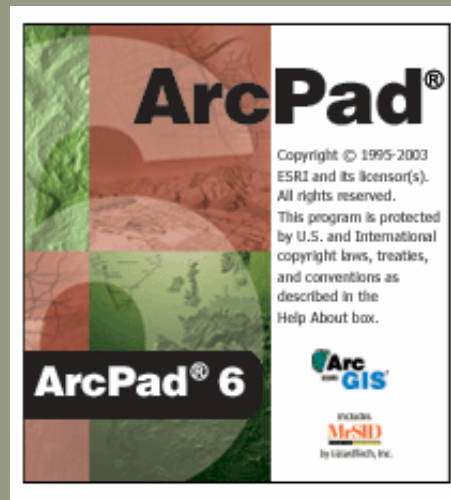
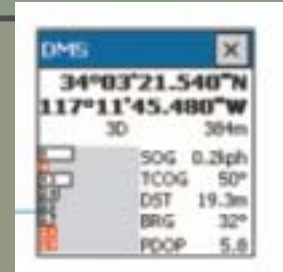
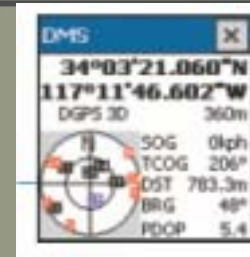


Global Positioning System (GPS)

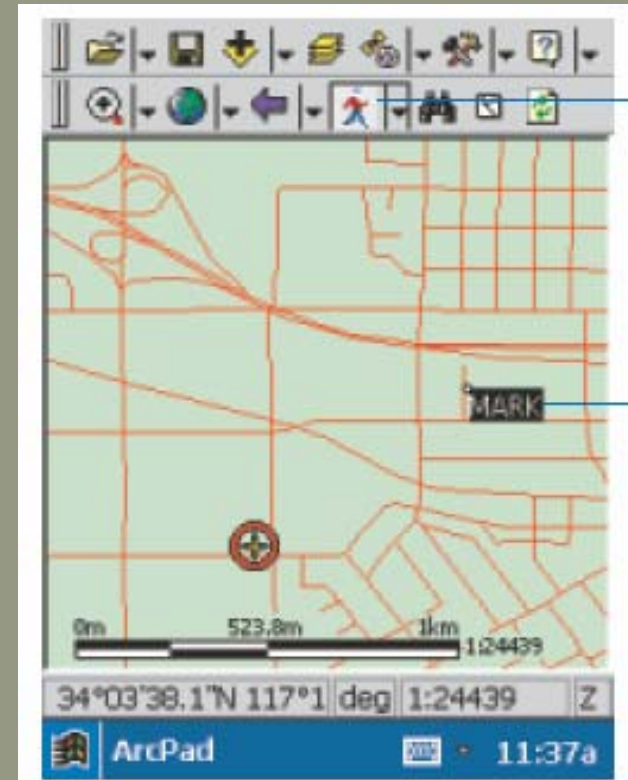
- hardware



GPS position window



- software

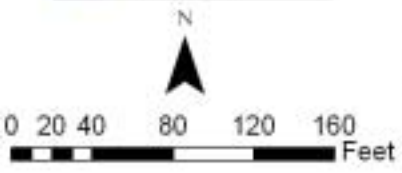


Typical data collection window

Milne Park

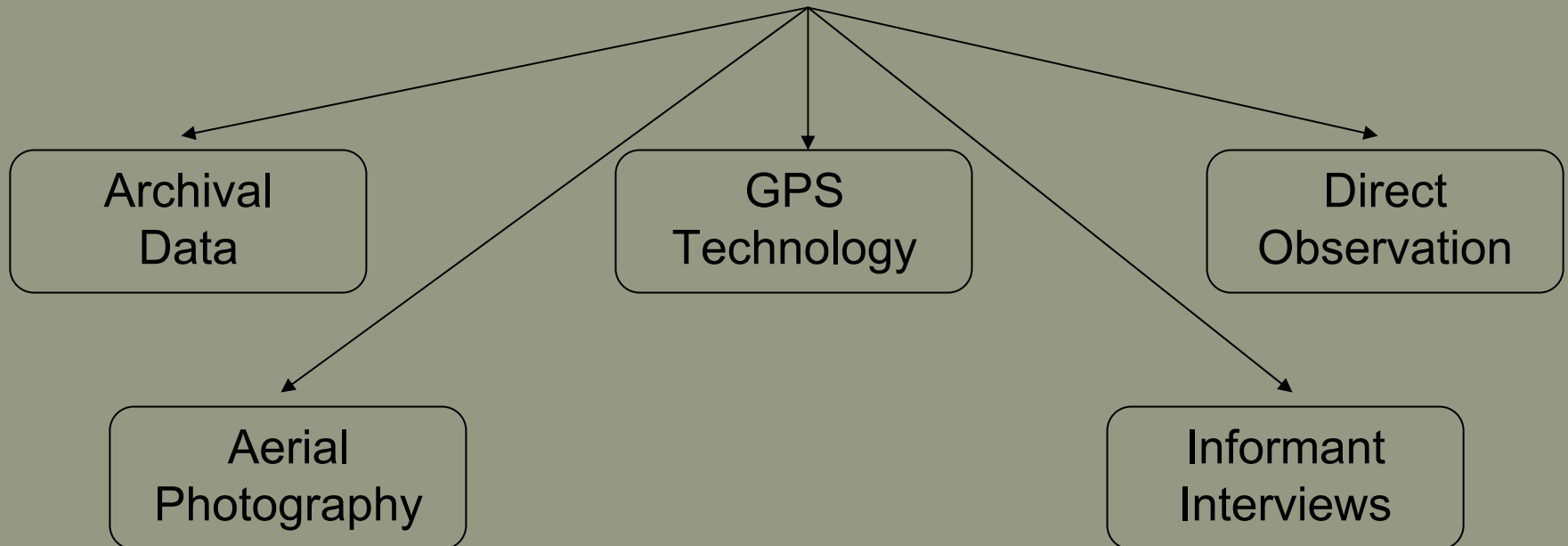
- TA1 contains SF1
- TA2 contains SF2
- TA3 contains SF3
- Path - P1

- Lights
- Trash can
- Dugout
- Park access
- Bleachers
- Scoreboard
- Drinking fountain
- Backstop
- Rest rooms
- Batting cage
- Concession stand
- Work shed



Instrument Design

BRAT (Bedimo-Rung Assessment Tools)



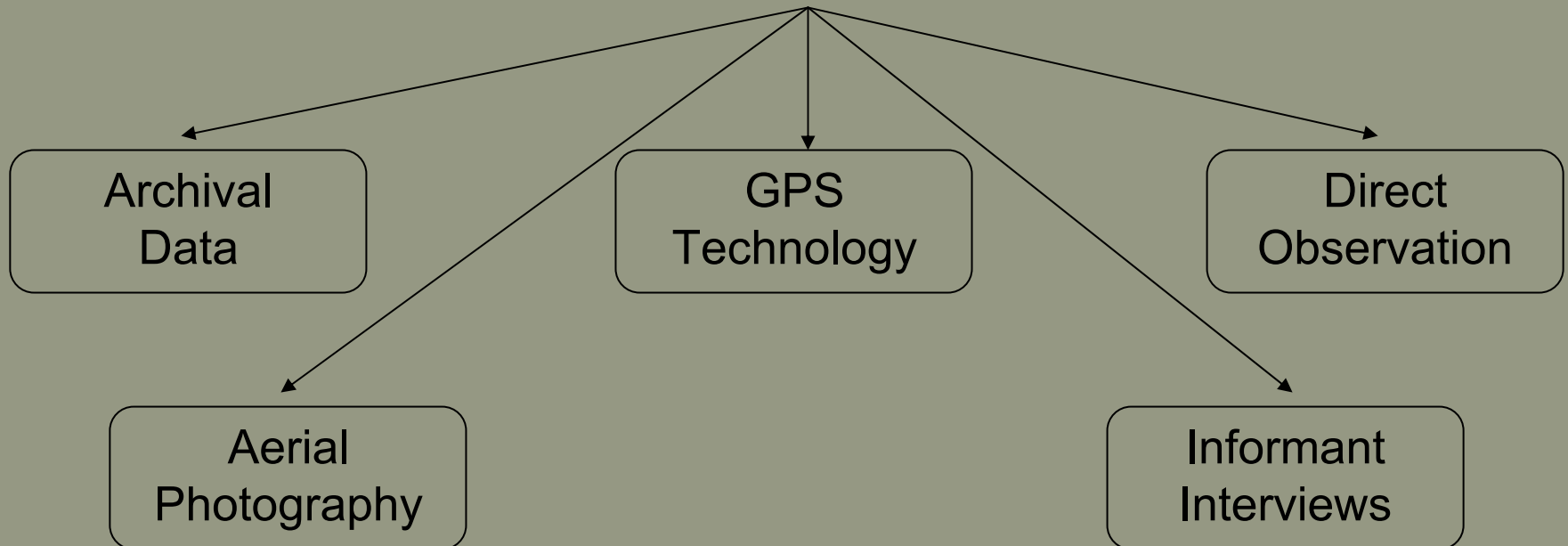


Informant Interview (BRAT-II)

- Survey of agency director or park manager
- Data on policies & management of park:
 - fees, reservations
 - hours of operation
 - staffing, supervision
 - programming
 - maintenance & security policies
 - budgeting
 - user visits, traffic volume

Instrument Design

BRAT (Bedimo-Rung Assessment Tools)

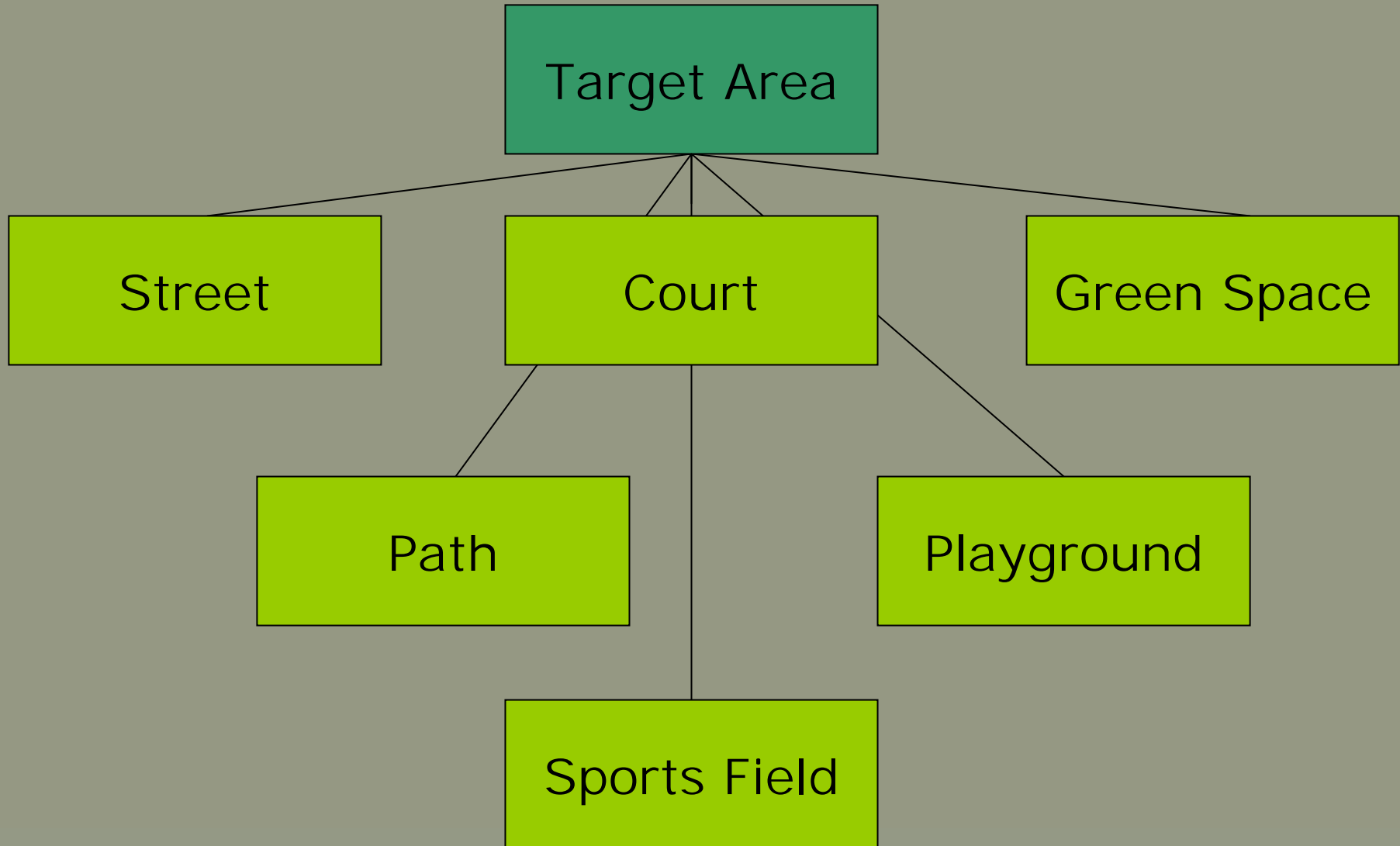


Direct Observation (BRAT-DO)

- Paper-and-pencil audit tool to measure park characteristics.
- Inter-observer reliability assessed (Fall 04)
- Intra-observer reliability & time-dependent variation assessed (March 05)



Data Collection Forms correspond to Geographic Areas



Number of Items in BRAT-DO by Domain & Geographic Area

	Domains					
Geographic Areas	Access	Condition	Esthetics	Features	Safety	<i>Total Items</i>
Target Area Items	5	24	15	38	3	85
Street Items	11	0	0	0	2	13
Court Items	6	3	0	17	0	26
Green Space Items	1	1	1	1	0	4
Path Items	1	1	0	7	2	11
Playground Items	2	4	0	8	7	21
Sports Field Items	5	2	0	14	0	21
Total Items	31	35	16	85	14	181



Procedures

- 3 rounds of testing
- Round 3 completed Fall 2004
- Simultaneous observation (AM)
- 15 teams of observer pairs
- 2 parks
- 4 sampled Target Areas per park
- Each team surveyed 2 TAs
- Each of 8 TAs surveyed 3-4 times by 3-4 different teams
- Gold Standard assessment by experts done 2 weeks earlier



Analysis

- Reliability
 - sum of # obs w/majority response in an area divided by total # areas
- Validity
 - sum of # obs w/correct response in an area divided by total # areas
- Reliability & validity of individual items grouped by domain and geographic area

Results: Inter-Rater Reliability by Domain

	# Items	Average Agreement (Range)	# items \geq 70% Agreement	% items \geq 70% Agreement
Access	31	88.2% (66.7-100)	30	96.8%
Condition	35	85.1% (63.6-100)	32	91.4%
Esthetics	16	83.7% (66.7-100)	14	87.5%
Features	85	91.9% (66.7-100)	83	97.6%
Safety	14	85.6% (72.7-100)	14	100.0%
Overall	181	86.9% (67.3-100)	173	95.6%

Results: Validity by Domain

	# Items	Average Agreement (Range)	# items \geq 70% Agreement	% items \geq 70% Agreement
Access	30	84.5% (62.5-100)	28	93.3%
Condition	35	72.6% (36.4-100)	21	60.0%
Esthetics	16	68.3% (33.3-100)	10	62.5%
Features	85	88.3% (45.5-100)	79	92.9%
Safety	14	79.7% (36.4-100)	12	85.7%
Overall	180	78.7% (33.3-100)	150	83.3%

Results: Selected Individual Items

Domain	Geographic Area	Item	N (sites)	N (obs)	# Possible Response Options	Individual Item Reliability	Individual Item Validity
Access	Target Area	Can the entire TA be locked?	8	30	2	93.8%	93.8%
Access	Street	What is the traffic volume of the street?	10	38	2	90.0%	80.0%
Access	Court	Are there sources of light that would allow the courts to be used at night?	3	12	2	100.0%	100.0%
Condition	Target Area	Rate the condition of the landscaping in the Target Area.	8	30	5*	87.5%	87.5%
Condition	Target Area	How much litter is present in the Target Area?	8	30	5*	74.0%	55.2%
Condition	Court	How much of the court structures appear broken or missing on the courts?	3	12	5*	91.7%	58.3%
Condition	Green Space	Rate the condition of the surface of the green space.	10	36	5*	89.2%	84.2%
Condition	Playground	How much deterioration or corrosion is evident on the play equipment?	3	11	5*	63.9%	47.2%
Esthetics	Target Area	Rate the appeal of the view from within the Target Area.	8	30	5*	81.3%	81.3%
Esthetics	Green Space	What portion of the Green Space could potentially be in the shade?	10	36	5	69.2%	33.3%
Features	Target Area	Are there any picnic tables in the Target Area?	8	30	2	100.0%	100.0%
Features	Green Space	Describe the surface area of the Green Space/Open Area.	10	36	2	100.0%	100.0%
Features	Path	What is the surface of the path or path segment made of?	4	15	4	75.0%	75.0%
Features	Sports Field	What structures are present on the sports field: Scoreboard	8	29	2	96.9%	90.6%
Safety	Target Area	How many of the restrooms are gender-labeled?	8	30	3	83.3%	77.1%
Safety	Playground	If playground surfacing is a loose material, how deep is it?	3	11	3	83.3%	83.3%

*Assessed on a 5-point scale, then dichotomized for this analysis



Discussion

- Good inter-rater reliability
- Validity somewhat less good
 - Gold Standard assessment conducted 2 weeks prior to data collection
 - Items that are time-sensitive may need multiple observations over time
- Shade questions scored poorly
 - other techniques should be investigated
- Subjective items require more training
- Objective items scored highest on both reliability and validity



Future Work

- Training
- Mapping
- Scale development & summary scores
- Integration & streamlining with other BRAT instruments
- Use of PDAs
- Study of BRAT and physical activity