

Psychology Working Group

Tara Brinkman, PhD

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CCSS

Childhood Cancer
Survivor Study



St. Jude Children's
Research Hospital

An NCI-funded Resource

Psychology Working Group, outcomes and interventions involving:

- Neurocognitive function
 - E.g., Neurocognitive questionnaire, CNS Vital Signs
- Psychosocial function
 - Emotional distress, pain, sleep
 - Social attainment / functional independence
- Health-related quality of life
 - E.g., SF-36

Working Group Membership

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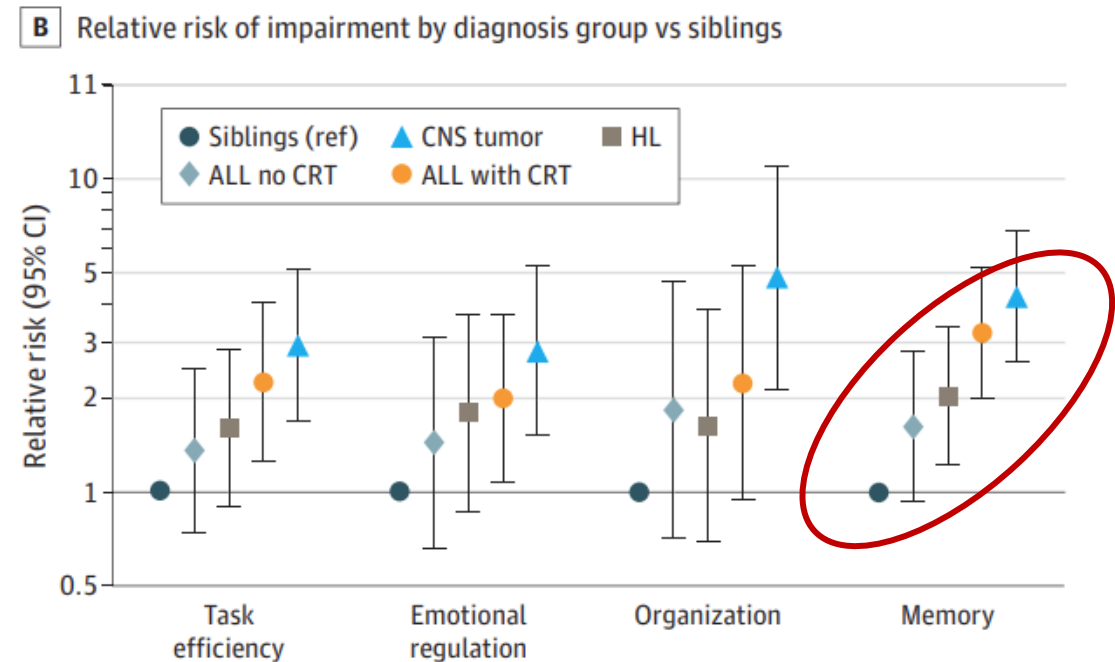
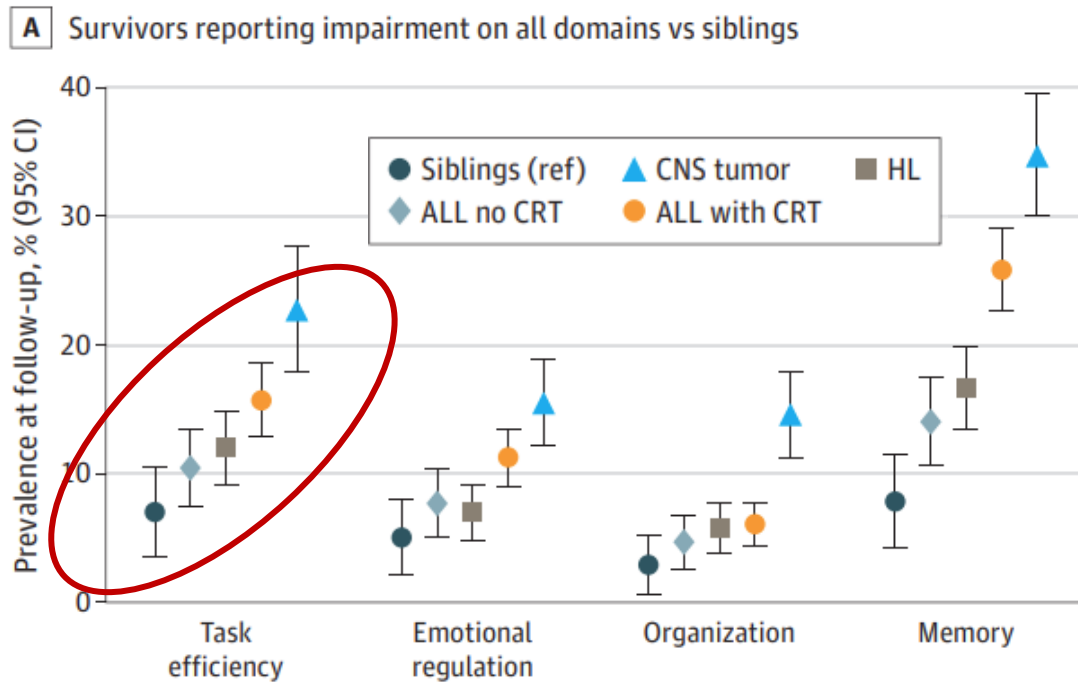
Name	Discipline	Institution
Pim Brouwers	Neuroscience	National Institute of Mental Health
Austin Brown	Epidemiology	Baylor College of Medicine
Lauren Daniel	Psychology	Rutgers University
Kim Edelstein	Neuropsychology	Princess Margaret Cancer Center
Bob Hayashi	Pediatric Oncology	Washington University – St. Louis
Meg Lubas	Social Work/Public Health	Radford University
Jordan Marchak	Psychology	Emory University
Kathy Ruble	Nursing	Johns Hopkins University
Fiona Schulte	Psychology	University of Calgary
Derek Tsang	Radiation Oncology	Princess Margaret Cancer Center
Ellen van der Plas	Neuropsychology	Arkansas Children's Hospital
Emily Walling	Pediatric Oncology	University of Michigan
Megan Ware	Health Behavior	St. Jude Children's Research Hospital
Christopher Weldon	Surgery	Harvard University
AnnaLynn Williams	Epidemiology	University of Rochester

- 7 Published/In Press Manuscripts (since 1/1/2022)
- 5 Currently Submitted Manuscripts
- 10 Analyses/Manuscripts in Process
- 8 Concepts in Development
- 5 New AOIs (since 1/1/2022)

Highlights of Recently Completed Research

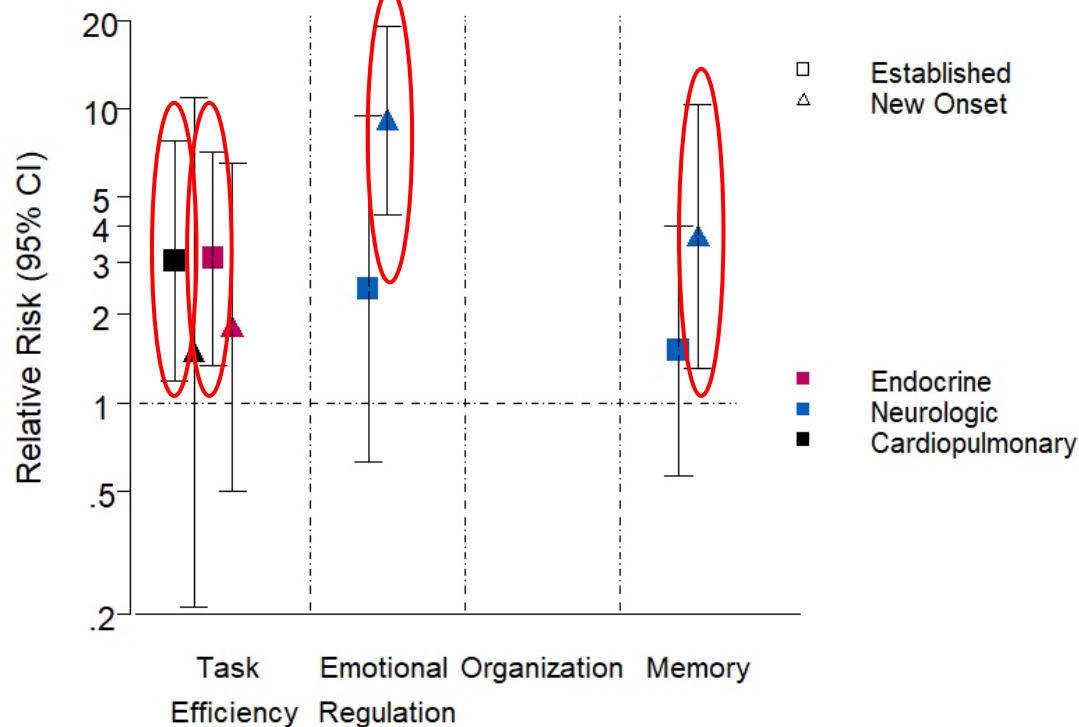
Phillips et al., Late-onset cognitive impairment. *JAMA Netw Open*. 2023

No impairment at baseline
Mean follow-up interval 11.6 years

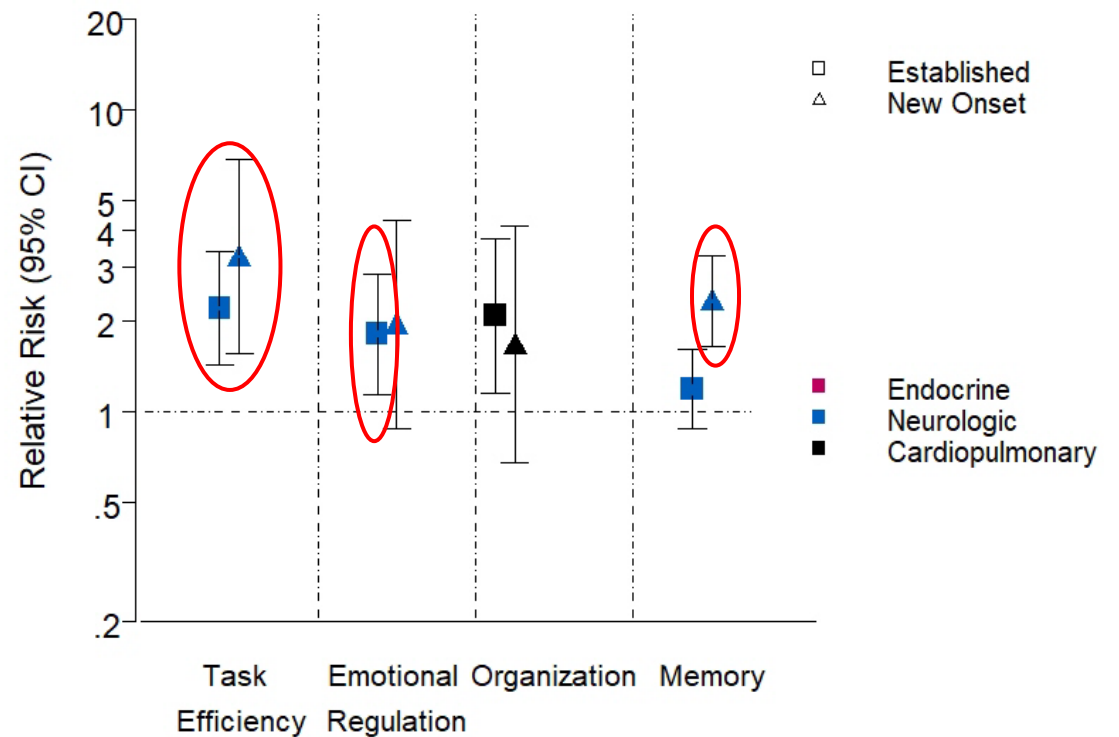


Highlights of Recently Completed Research

Phillips et al., Late-onset cognitive impairment. *JAMA Netw Open.* 2023



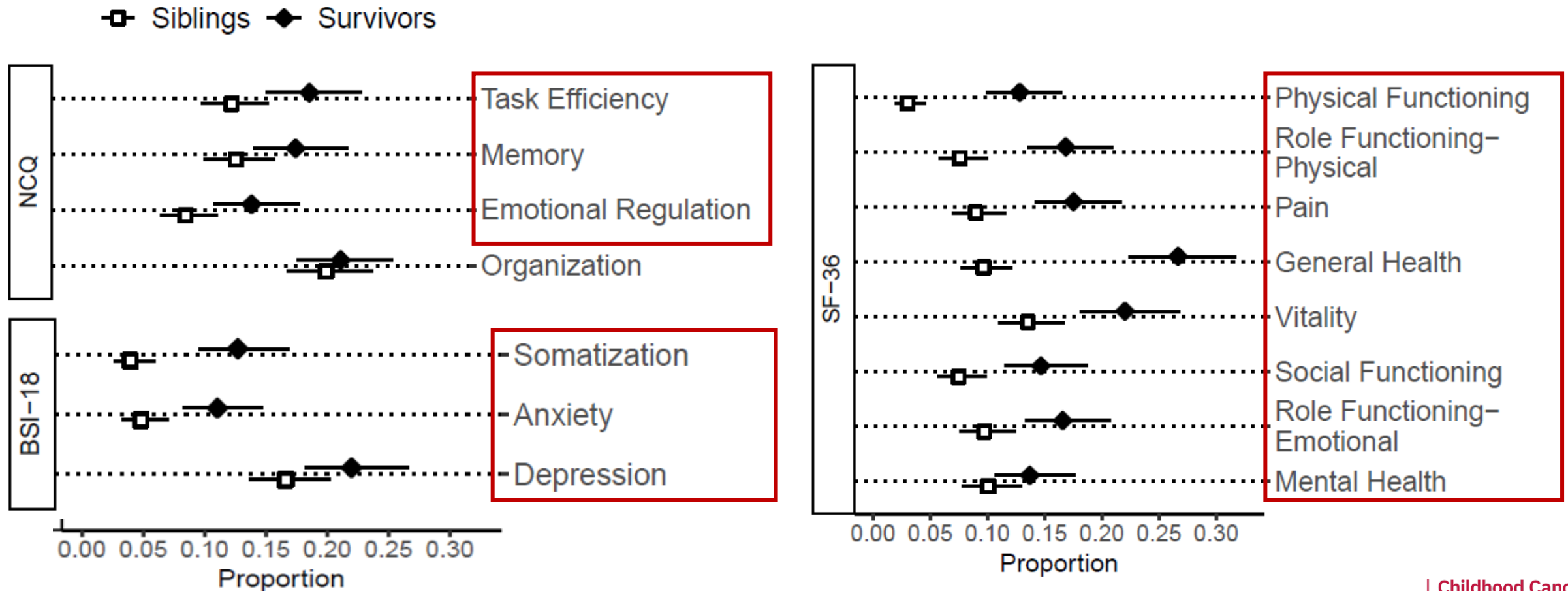
ALL no CRT



CNS tumors

Highlights of Recently Completed Research

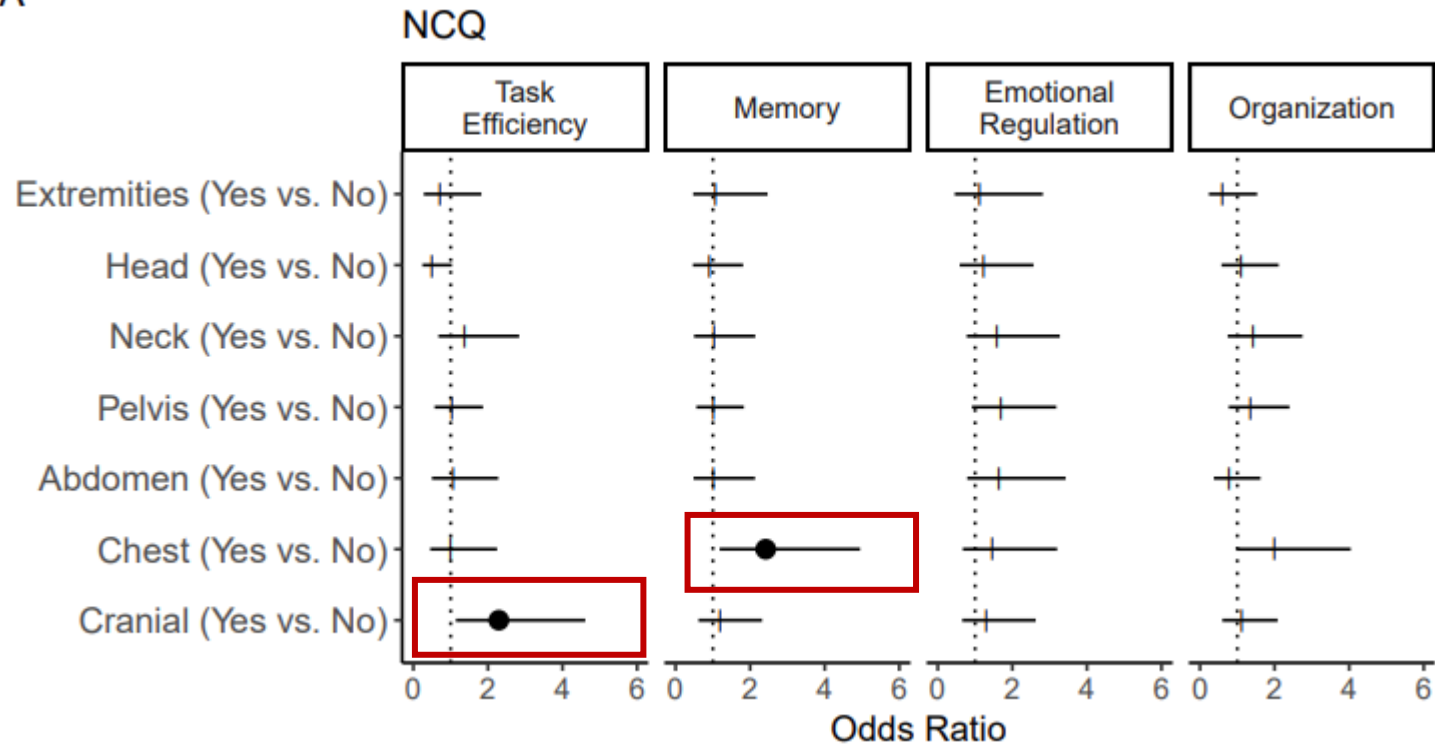
van der Plas et al., Neurocognitive outcomes in rhabdomyosarcoma. *Under review.*



Highlights of Recently Completed Research

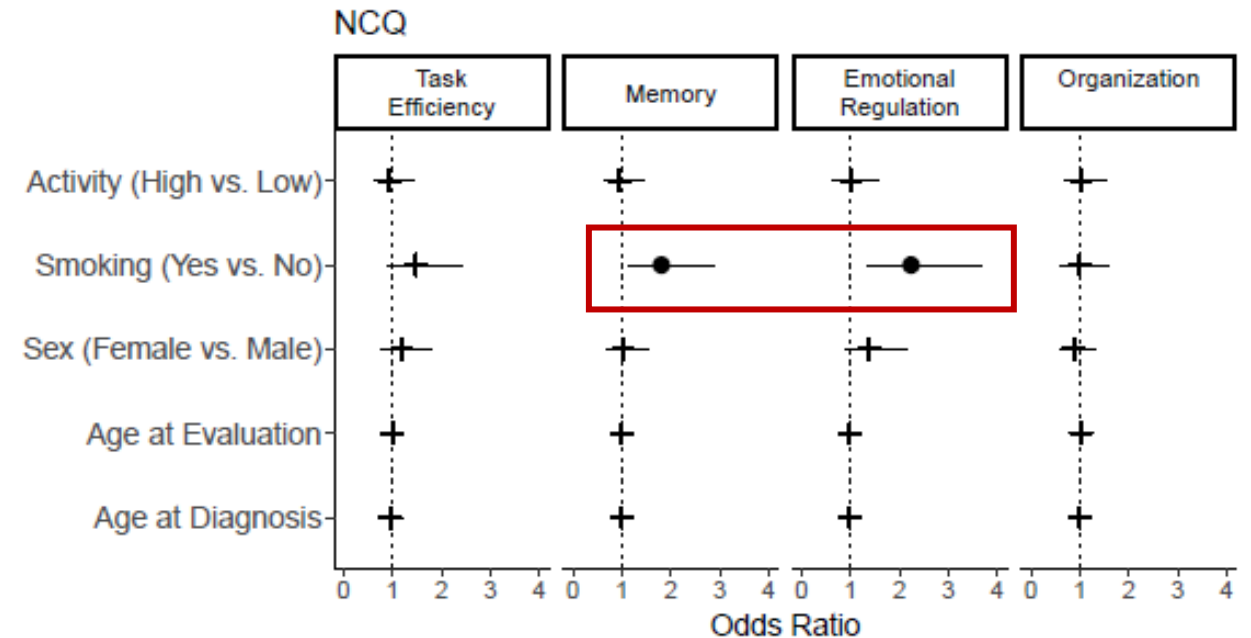
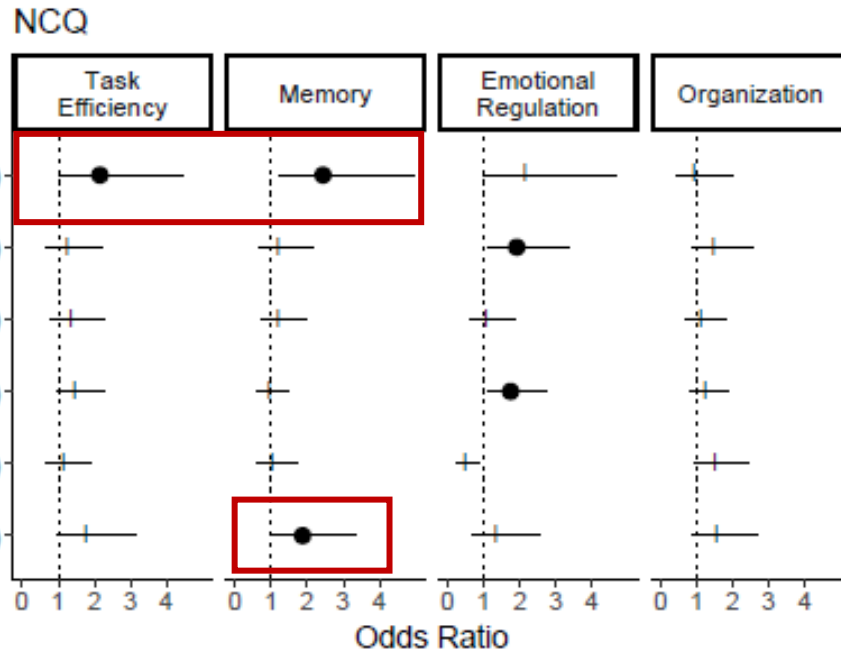
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Highlights of Recently Completed Research

van der Plas et al., Neurocognitive outcomes in rhabdomyosarcoma. *Under review.*



Highlights of Recently Completed Research

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Schulte et al., Models to predict poor health-related quality of life. *JAMA Netw Open*. 2022

Physical and Mental HRQoL in survivors

	T1		T2		Change from T1 to T2			
	Suboptimal	Optimal	Suboptimal	Optimal	Declining	Persistently Suboptimal	Improved	Persistently Optimal
Physical Component	11.1%	88.9%	14.6%	85.4%	8.7%	5.3%	5.8%	80.2%
Mental Component	17.5%	82.5%	15.3%	84.7%	8.4%	6.3%	11.0%	74.3%

Highlights of Recently Completed Research

Schulte et al., Models to predict poor health-related quality of life. *JAMA Netw Open*. 2022

Suboptimal HRQoL at T2

	PCS	MCS
	OR (95% CI)	OR (95% CI)
Female sex	1.6 (1.3-2.1)	1.3 (1.0-1.6)
Unemployed	1.4 (1.0-1.9)	1.3 (1.0-1.7)
Physical inactivity	1.5 (1.2-1.9)	n/a
Neurological disorders	2.3 (1.7-3.1)	1.6 (1.2-2.1)
Musculoskeletal disorders	2.3 (1.6-3.3)	n/a
Depression	1.6 (1.2-2.3)	2.3 (1.6-3.1)
Memory problems	1.6 (1.1-2.1)	n/a
Task efficiency problems	n/a	1.9 (1.5-2.5)
Suboptimal HRQoL	4.3 (3.2-5.6)	2.5 (1.9-3.3)

Decline in HRQoL from T1 to T2

	PCS	MCS
	OR (95% CI)	OR (95% CI)
Female sex	1.7 (1.3-2.2)	1.2 (0.9-1.6)
Unemployed	1.6 (1.1-2.3)	1.7 (1.2-2.4)
Physical inactivity	1.6 (1.3-2.1)	1.3 (1.0-1.7)
Neurological disorders	2.2 (1.5-3.0)	n/a
Musculoskeletal disorders	2.2 (1.4-3.6)	n/a
Depression	1.8 (1.2-2.7)	4.3 (2.4-7.8)
Memory problems	1.6 (1.1-2.3)	n/a
Task efficiency problems	n/a	1.9 (1.3-2.7)

Highlights of Recently Completed Research

Daniel et al., Sleep disorders in long-term survivors of childhood cancer. *APSS*. 2023

Sleep Domain	Sleep Variable	Survivors	Siblings	PR (95% CI)
		(N=12,340)	(N=2,395)	
		N (%)	N (%)	
Sleep Duration	Total sleep time <6 hours	1486 (12.0)	255 (10.6)	1.30 (1.13 - 1.50)
Sleep Quality	PSQI Total Score >5	5561 (45.1)	959 (40.0)	1.20 (1.13 - 1.27)
Insomnia Symptoms	Sleep Onset Latency >30 minutes	4767 (38.8)	763 (32.0)	1.26 (1.18 - 1.35)
	Sleep Efficiency <85%	4021 (33.3)	699 (29.9)	1.19 (1.10 - 1.29)
	Night awakening/early morning awakening >3 times per week	4306 (35.6)	851 (36.0)	1.09 (1.02 - 1.16)
Sleep Disordered Breathing	Snoring >3 times per week	2164 (18.0)	410 (17.4)	1.11 (1.01 - 1.23)
Delayed Sleep Timing	Sleep onset after 1 am	756 (6.2)	83 (3.5)	1.78 (1.39 - 2.29)
Sleep Medication Use	Three or more times a week	1629 (13.2)	276 (11.5)	1.28 (1.12 - 1.45)

Highlights of Recently Completed Research

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Daniel et al., Sleep disorders in long-term survivors of childhood cancer. *APSS*. 2023

	Poor Sleep Quality	Sleep Disordered Breathing	Delayed Sleep Timing	Short Sleep Duration
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
None/low	1.0 (ref)	1.0 (ref)	1.0 (ref)	1.0 (ref)
Medium	1.22 (1.13 – 1.30)	1.16 (1.03 - 1.30)	1.23 (1.16 - 1.46)	1.32 (1.20 - 1.46)
High	1.32 (1.21 - 1.44)	0.98 (0.84 - 1.15)	1.43 (1.03 - 1.97)	1.54 (1.36 - 1.74)
Severe	1.48 (1.34 – 1.63)	0.97 (0.77 – 1.21)	1.45 (0.95 - 2.21)	1.79 (1.55 – 2.06)

Model adjusted for sex, age, race, and BMI.

Highlights of Recently Completed Research

Daniel et al., Frailty and sleep disturbances. *Manuscript in development.*

	Sleep Quality	Sleep duration	Sleep Onset Latency	Sleep Timing	Sleep Efficiency	Snoring/ Pauses in breathing
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Not Frail	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Frail	5.12 (3.98 - 6.59)	3.47 (2.69 - 4.48)	2.69 (2.16 - 3.35)	2.93 (2.04 - 4.22)	2.60 (2.10 - 3.23)	2.00 (1.57 - 2.54)
Pre-frail	2.57 (2.20 - 3.02)	1.75 (1.40 - 2.18)	1.79 (1.53 - 2.09)	1.81 (1.30 - 2.54)	1.58 (1.35 - 1.85)	1.54 (1.27 - 1.86)
Chronic Disease Burden (vs. none/low)						
Medium	1.46 (1.31 - 1.63)	1.27 (1.06 - 1.51)	1.30 (1.16 - 1.46)	1.37 (1.06 - 1.77)	1.28 (1.14 - 1.44)	1.11 (0.97 - 1.28)
High	1.54 (1.30 - 1.81)	1.08 (0.83 - 1.39)	1.59 (1.34 - 1.88)	1.19 (0.80 - 1.77)	1.47 (1.24 - 1.74)	0.93 (0.76 - 1.14)
Severe	2.32 (1.75 - 3.09)	1.57 (1.07 - 2.29)	2.01 (1.54 - 2.63)	2.20 (1.27 - 3.81)	1.44 (1.09 - 1.91)	0.78 (0.56 - 1.10)

Model adjusted for sex, age, and race.

Manuscripts Submitted

1. Symptom progress and adverse health outcomes (Huang/Krull)
2. Neurocognitive outcomes in AYA survivors (Wang/Henderson)
3. Neurocognitive outcomes in rhabdomyosarcoma (van der Plas/Edelstein)
4. Neurologic morbidity and independence in CNS treated survivors (Vuotto/Brinkman)
5. Temporal changes in neurocognition in glioma survivors (Papini/Brinkman)

Manuscripts Drafted

1. Mental health in ALL treated with chemotherapy only (Nannes/Schulte/Oeffinger)
2. Special education outcomes (Bashore/Edelstein)
3. Sleep disorders in long-term survivors (Daniel/Krull)
4. Frailty and sleep disorders (Daniel/Brinkman)
5. Neurocognition and independence in medulloblastoma survivors (Papini/Brinkman)
6. Symptom phenotypes and health behaviors in survivors (Webster/Krull)
7. Sex mediation of neurocognitive/psychosocial outcomes (Peterson/Edelstein)
8. External injury-related mortality (Lubas/Brinkman)

Analyses Ongoing

1. Psychological stress, social functioning and phenotypic aging (Rentscher/Ness)
2. Longitudinal changes in functional independence (Lange/Brinkman)
3. Temporal changes in neurocognitive outcomes for ependymoma (Papini/Brinkman)
4. Temporal changes in unemployment (Bhatt/Mulrooney)
5. Deficit accumulation index (Williams/Krull)
6. Neighborhood SES and psychosocial outcomes (Bai/Yasui/Krull)
7. Perceptions of risk for sexual dysfunction (Sopfe/Marchak)
8. Sexual function in male survivors (Marchak/Meacham)
9. Psychological outcomes in bereaved siblings (Buchbinder/Brinkman)
10. Diabetes mellitus and neurocognitive outcomes (Webster/Krull)

Trainee Awards:

1. Impact of sleep trajectories on neurocognitive function (Papini/Brinkman)
2. Longitudinal patterns and predictors of cancer-related fears (Tutelman/Schulte)

Ancillary Studies: Insomnia

CCSS

MPIs: Tara Brinkman and Kevin Krull (St. Jude Children's Research Hospital)

Title: Impact of eHealth intervention for insomnia on late effects of childhood cancer

Funding Source: National Cancer Institute (R01); \$4,271,243

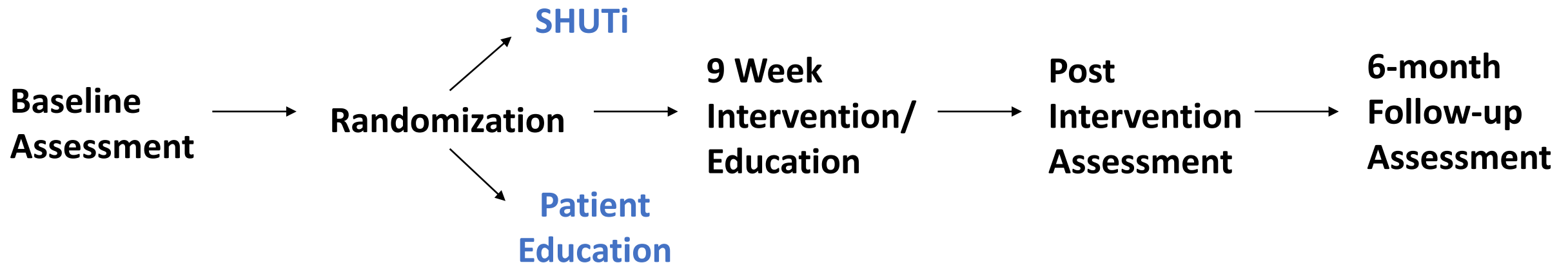
Aims:

1. To assess impact of eHealth insomnia treatment
2. To assess impact of improved sleep on neurocognitive impairment, emotional distress, and cardiovascular health

Ancillary Studies: Insomnia

Randomized clinical trial (not blinded)

9-week intervention with 6-month follow-up



Ancillary Studies: Insomnia

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Outcome	Assessment Method
Insomnia Symptoms	<ul style="list-style-type: none">• Insomnia Severity Index• Daily Sleep Diary• Actigraphy (WHOOP)
Neurocognitive Function	<ul style="list-style-type: none">• CNS Vital Signs• CCSS Neurocognitive Questionnaire
Emotional Health	<ul style="list-style-type: none">• PHQ-9
Quality of Life	<ul style="list-style-type: none">• SF-36
Cardiovascular Health	<ul style="list-style-type: none">• Physical activity (WHOOP)• Heart rate variability (WHOOP)• Dried Blood Spot Cards:<ul style="list-style-type: none">– Inflammation– Oxidative stress– Vascular function– Lipid profiles

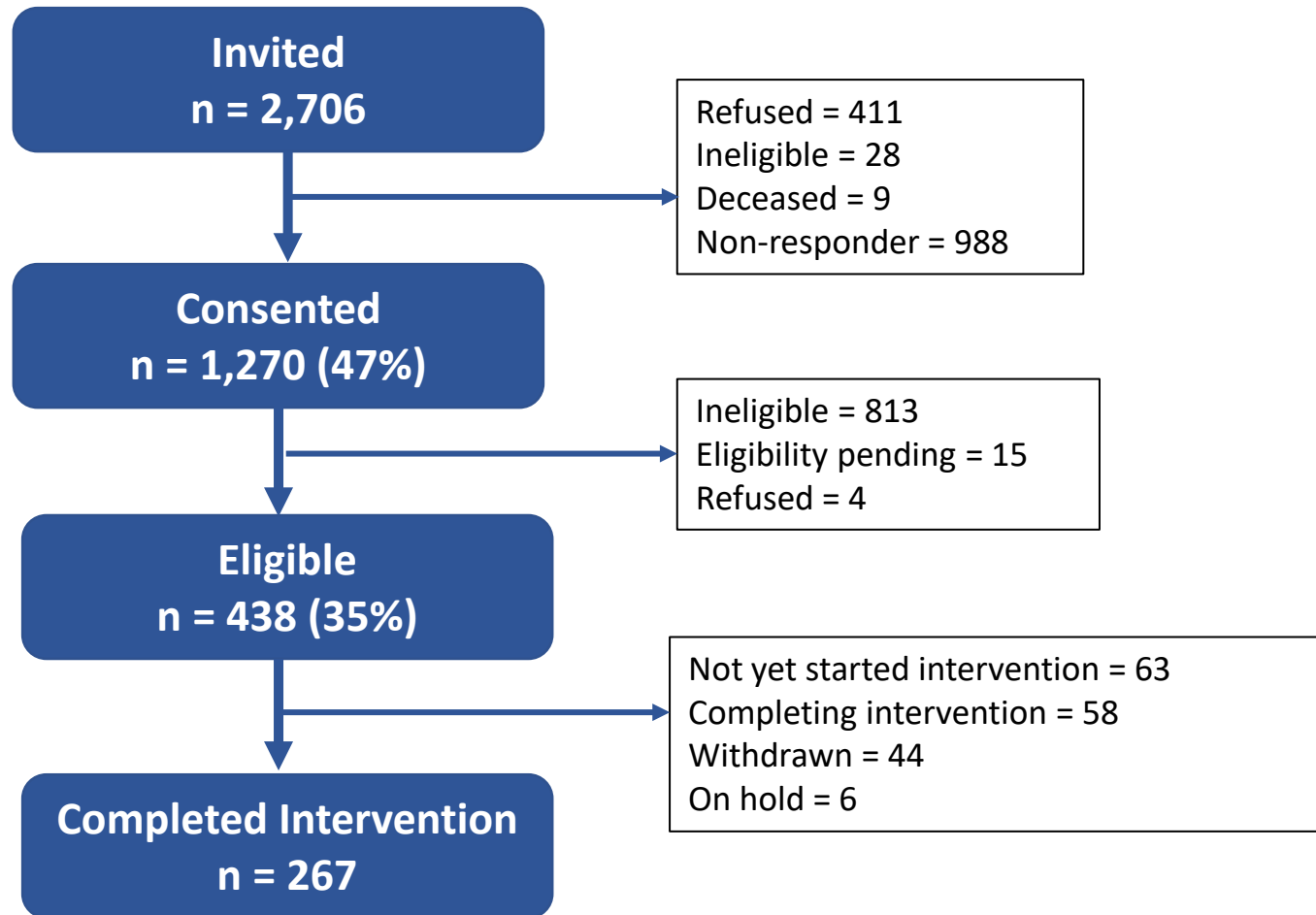
WHOOP UNITE™



CNS Vital Signs™



Ancillary Studies: Insomnia



Enrollment Goals:

320 evaluable at 9 weeks

280 evaluable at 6 months

1. Remote/mHealth interventions to improve neurocognitive and psychosocial outcomes
2. Examination of the impact of less intense therapeutic exposures in survivors using direct assessment of neurocognitive function
3. Evaluation of neurocognitive and psychosocial functional changes with age

Five Year Plan: Research Priorities

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1. Remotely delivered cognitive behavioral therapy to treat emotional distress, pain, and pain-related disability
2. Remotely delivered psychoeducation, behavioral and cognitive interventions to facilitate improvement and adaption to neurocognitive deficits
3. Evaluate impact of cancer and cancer therapies on directly assessed neurocognitive function in aging survivors

Challenges and Opportunities

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- Limited scope of psychological outcomes
 - Language, spatial perception, attention, processing speed, other executive functions
 - Loss, worry, fear, joy, hope, inspiration
 - Socialization, isolation/loneliness, withdrawal/avoidance
 - Mental health disorders and treatment
- Direct assessment of cognitive function
- PROMIS social participation
- Significant other survey
- Impact of COVID

Questions?