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Establishing Initial Content Validity, Interrater Reliability, and Intra-rater Reliability of the Revised Visual Activity Sort for At-Risk Adolescents and Young Adults

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Abstract

Background: The purpose of this study was to establish the content validity and inter- and intra-rater reliability of the revised Visual Activity Sort, which is a card sorting assessment designed specifically for at-risk adolescents and young adults.

Method: Six content experts were selected and asked to rate the relevancy of each of the 121 Visual Activity Sort cards. Two trained raters participated in the establishment of inter- and intra-rater reliability with 30 high school students attending a charter school for at-risk adolescents and young adults in a socioeconomically disadvantaged urban area.

Results: Based on the content experts' ratings, a final summary content validity index of 74 maintained cards was established as high (*CVI* = 0.91, *p* < 0.05). Both inter- and intra-rater reliability were found to be high with *ICCs* of 0.83 and 0.84 (*p* < .000), respectively.

Conclusion: Raters and authors recommended the addition of five cards addressing social media and internet safety, setting and maintaining healthy boundaries, managing social media and internet use and addiction, and navigating government agencies. These cards will be added and examined by content experts in a future study.

Comments

The authors declare that they have no competing financial, professional, or personal interest that might have influenced the performance or presentation of the work described in this manuscript.

Keywords

occupational therapy, card sorting assessment, psychometric properties

Cover Page Footnote

Credentials Display

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The United States Census Bureau (Creamer et al., 2022) suggests that nearly 17% of youth under 18 years of age live in poverty, or approximately 12.5 million people. Such youth come from predominantly Black and Brown communities in socioeconomically disadvantaged urban areas that are characterized by high crime and violence rates; scant opportunities for employment in livable wage jobs; public school systems that are under-resourced and fail to teach basic academic competencies, such as reading and writing; neighborhoods in which it is unsafe to carry out daily life activities; and communities that are more likely to be targeted by racial profiling and law enforcement misconduct (National Center for Children in Poverty, 2022). Such youth are at greater risk than the national average for school failure and dropout, teen pregnancy, juvenile delinquency, criminal justice system involvement, under and unemployment in adulthood, and one or more periods of homelessness throughout the lifespan (Coalition for At-Risk Youth, 2016).

Occupational therapists typically do not provide services to at-risk youth unless therapists are employed in the school or criminal justice system, and even then, many youths in the school system who had once received occupational therapy services are commonly discharged from those services by early adolescence (Mankey, 2011, 2012). It is unclear how many occupational therapists work in the juvenile and criminal justice systems; however, a 2019 workforce survey conducted by the American Occupational Therapy Association ([AOTA], 2020) did not include this setting as an area of practice. Yet, occupational therapists are the professionals who could assess and provide needed interventions to support at-risk youth attaining critical life skills necessary to transition successfully to young adulthood, including social skills, school and work skills, self-care and health management, and community participation skills.

In 2011, the second author developed a card sorting instrument, the Visual Activity Sort for At-Risk Adolescents and Youth, after identifying a gap in occupational therapy assessments for this population. Card sorting instruments are unique because they primarily use images to facilitate discussion and identification of client concerns rather than printed questions or surveys asked by health professionals who may be perceived by clients as outsiders to their community (Tyminski et al., 2020). One of the most notable card sorting instruments is the Activity Card Sort (Baum & Edwards, 2008) and its many versions for varying populations and age groups (Hoyt et al., 2020; Laver-Fawcett et al., 2016; Uemura et al., 2019). The Activity Card Sort uses photographs of people who are similar to the clients for whom the instrument is intended and who are engaged in an array of daily life occupations (including activities of daily living [ADL], instrumental activities of daily living [IADL], health management, work/school, and leisure and recreation) (Baum & Edwards, 2008). Clients are asked to view each card and select those that depict activities for which they are currently experiencing difficulty. Card sorting assessments provide efficient and expeditious methods to assess client concerns with daily life activities, particularly for people with cognitive deficits or language disorders or who may otherwise feel uncomfortable broaching a sensitive topic with an unfamiliar health care professional.

In 2011, when the second author developed the Visual Activity Sort for At-Risk Adolescents and Young Adults, the Adolescent and Young Adult Activity Card Sort (Berg et al., 2015) had not been published. The Adolescent and Young Adult Activity Card Sort is a version of the Activity Card Sort (Baum & Edwards, 2008) specifically designed for young people in middle adolescence to early adulthood. Although the Adolescent and Young Adult Activity Card Sort has been found to be content valid and possess high intra-rater reliability (Berg et al., 2015), the cards primarily reflect a white, heteronormative, middle-class sector of society.

In the present study, the authors' objective in revising the Visual Activity Sort was to assemble a set of cards that better reflect the diversity of youth for whom the instrument is intended and include occupations that are unsanctioned or societally condemned but are commonly part of daily life for at-risk adolescents. Unlike the Adolescent and Young Adult Activity Card Sort, the revised Visual Activity Sort contains cards addressing such unsanctioned occupations as the exploration of gender identity, sexual intimacy, smoking, alcohol and drug use, and safe sex practices. The revised Visual Activity Sort aims to invite discussion about topics that many at-risk youths may feel uncomfortable broaching but may be areas of concern for which assistance is desired. It was also our aim to select card images showing a wide array of human diversity with regard to race, ethnicity, gender, gender orientation, socioeconomic level, and disability status.

The purpose of the present study was to establish the initial content validity, interrater reliability, and intra-rater reliability of the revised Visual Activity Sort for At-Risk Adolescents and Young Adults. Content validity of the revised Visual Activity Sort is needed to ensure that the cards exhaustively reflect human diversity and daily life activities common to at-risk adolescents and young adults. Interrater reliability must be established to determine that the instrument yields consistent scores among independent raters. Intra-rater reliability must be discerned to ensure the instrument yields consistent data over repeated administrations by the same rater. Our research questions addressed the following:

1. Does the revised Visual Activity Sort possess content validity for a population of at-risk adolescents and young adults as determined by a panel of experts?
2. Does the revised Visual Activity Sort possess interrater reliability for a sample of at-risk adolescents and young adults, as determined by two trained raters who independently administered the instrument to the same set of 15 participants?
3. Does the revised Visual Activity Sort possess intra-rater reliability for a sample of at-risk adolescents and young adults, as determined by two trained raters who each administered the instrument to the same participants 1 week apart?

Method

Research Design

In this instrument development and testing study, the initial psychometric properties of the revised Visual Activity Sort for At-Risk Adolescents and Young Adults were established, including content validity, interrater reliability, and intra-rater reliability. The Rutgers University Institutional Review Board approved the study. Participants who were 18 years of age or older provided informed written consent. Informed written consent was obtained from a parent or guardian of participants who were 16 to 17 years of age; these participants also provided informed written assent.

Participants

Participants for the content validity component of this study were (a) health care professionals who held expertise in their work with at-risk adolescents and young adults and (b) adolescents and young adults (16 to 24 years of age) who were currently or had been at-risk for such life events as school dropout and homelessness and who possessed direct knowledge of the occupations of this age group based on personal experience. Participants in the interrater and intra-rater reliability components of this study were adolescents and young adults (16 to 24 years of age) who were recruited from a charter school for at-risk students residing in a socioeconomically disadvantaged area of a large urban city and who had experienced involvement in the juvenile delinquency system, had been or were currently homeless, and/or who had not succeeded in the traditional public school system. Participants were excluded if they were not English-

speaking or possessed a concomitant mental health illness with severe symptoms that could impact their study participation (e.g., anger management disorder, conduct disorder, intermittent explosive disorder).

Instruments

The revised Visual Activity Sort is comprised of 121 cards that depict common occupations characteristic of the developmental age of 16 to 24 years. The cards are divided into seven subcategories: (a) ADLs, (b) IADLs, (c) health management, (d) social participation, (e) work, (f) school, and (g) leisure. The original 121 cards were compiled by the second author as a result of her clinical work with at-risk adolescents and young adults residing in a shelter for homeless youth. Cards were compiled based on activities for which these youth indicated interest and desire, current participation, and concerns or problems.

Participants are shown each card individually and asked initially to sort the cards into five piles: (a) activities that they do not engage in; (b) activities in which they do not want to participate but have to; (c) activities that they perform without problem; (d) activities that they would like to engage in more or perform better; and (e) activities that they do not currently engage in but would like to explore. In the second sort, cards are combined from the following three piles: (a) activities that they do not want to participate in but must, (b) activities that they would like to engage in more or perform better, and (c) activities that they do not currently engage in but would like to explore. Participants are then asked to identify and rank the 10 activities that are most important to them. Once ranked, participants are then asked to rate each activity with regard to their participation level, motivation level, satisfaction level, and perceived competency level using a 3-point Likert scale ($1 = low$, $3 = high$). Administration of the revised Visual Activity Sort requires approximately 30 min and is intended to be made (a) before intervention to determine which life skills adolescents and young adults most desire to master and (b) after intervention to determine if intervention positively affected participants' level of participation, motivation, perceived satisfaction, and perceived competence. Change scores are then calculated at post intervention to determine whether changes were made in these four areas.

Data Collection

Content Validity

Six experts were asked to rate each card using a 4-point scale where $1 = not\ relevant$, $2 = somewhat\ relevant$, $3 = very\ relevant$, and $4 = extremely\ relevant$. The content experts were asked to rate each card independently and were blinded to each other's ratings. They were then asked to make qualitative written suggestions regarding revisions to make the cards more relevant and identify the content that they discerned to be absent. The experts were also asked to provide a qualitative written appraisal regarding whether the cards adequately reflected diversity of race, ethnicity, gender, gender orientation, socioeconomic level, and disability status. The content experts were blinded to each other's qualitative responses.

Interrater Reliability

Two trained raters administered the revised Visual Activity Sort to the participants. The raters received 10 hr of training in Visual Activity Sort administration by the first and second authors and achieved high interrater reliability with each other (intraclass correlation coefficient [ICC] = 0.86, $p <$ .001). Rater 1 carried out the first administration of the revised Visual Activity Sort with 15 participants. One week later, Rater 2 administered the revised Visual Activity Sort with the same set of 15 participants. The raters were blinded to each other's scores (de Raadt et al., 2021; Hallgren, 2012; Portney, 2020).

Intra-rater Reliability

The same two trained raters who administered the revised Visual Activity Sort to establish interrater reliability also participated in the establishment of intra-rater reliability. Rater 1 administered the revised Visual Activity Sort with six participants on two separate occasions, 1 week apart. Rater 2 administered the revised Visual Activity Sort with seven different participants on two separate occasions, 1 week apart. The raters were blinded to each other's scores (de Raadt et al., 2021; Portney, 2020).

Data Analysis

Content Validity

Content Validity was determined using a 3-step method proposed by Lynn (1986). In the first stage, after the content experts evaluated each card using a 4-point scale (1 = *not relevant*, 2 = *somewhat relevant*, 3 = *very relevant*, and 4 = *extremely relevant*), the cards that received ratings of 3 or 4 by 66% of the experts (i.e., four experts) were retained while all others were removed. In the second stage, a content validity index (*CVI*) was calculated for each remaining card. The *CVI* for each card was computed by dividing the number of experts who rated a card as relevant (with a score of 3 or 4) by the total number of panel experts. For example, if only three experts rated a card as relevant, the *CVI* was 3/6 = 0.50. To be retained, cards had to meet a 0.83 level of endorsement to establish content validity using six experts at a 0.05 significance level.

A summary *CVI* for the entire set of cards was calculated as the final step. The summary *CVI* for the entire set of cards was the number of cards deemed content valid divided by the full number of cards. For example, 45 cards that were rated as relevant and divided by the total number of cards (e.g., 50) would equal a summary *CVI* of 0.90.

The content experts' qualitative written feedback regarding card diversity and missing occupations were summarized by categories that emerged during analysis.

Interrater Reliability

Interrater reliability was established using two trained raters who independently administered the revised Visual Activity Sort to the same set of 15 participants 1 week apart. All rater scores at the first and second administration were compared using an *ICC* for ordinal data (two-way mixed, consistency, average measures) (de Raadt et al., 2021; Hallgren, 2012; Portney, 2020). The *ICC* was calculated through SPSS Version 28 (IBM, 2021) by comparing the scores of all 114 items of the revised Visual Activity Sort, including the 74 card ratings that were established by the panel of experts as content valid and the 40 items generated from the participants' 10 most prioritized activities (which were then rated for participation, motivation, satisfaction, and competence level).

Intra-rater Reliability

Intra-rater reliability was established using the same two trained raters who participated in establishing interrater reliability. Each rater independently administered both the first and second administrations of the revised Visual Activity Sort to a group of participants 1 week apart (Rater 1 administered the instrument with six participants, Rater 2 with seven participants). All rater scores at first and second administration were compared using an *ICC* (two-way mixed, consistency, average measures) (de Raadt et al., 2021; Portney, 2020) that was calculated through SPSS (IBM, 2021) by comparing the 114 items from each participant's revised Visual Activity Sort.

Results

Content Validity

Six content experts participated in establishing content validity of the revised Visual Activity Sort for At-Risk Adolescents and Young Adults. Four of the content experts were adults between 28 to 43 years of age (M = 32, SD = 7.34) who were professionals currently working with at-risk adolescents in separate settings and unfamiliar with each other. These four content experts were two certified occupational therapy assistants working in the public school system, one school psychologist, and one public school teacher. Three held bachelor's degrees, and one had earned a doctoral degree. Years of experience with this population ranged from 4 to 21 (M = 9, SD = 8.04). These four content experts identified as White, three identified as female, and one identified as gender diverse. Two additional content experts were adolescents 17 years of age who were attending a high school for at-risk adolescents in a socioeconomically disadvantaged area of a large urban area. These adolescents self-identified as female and Black.

Table 1 provides information about the content experts' ratings of each card. In the first stage of establishing content validity, 30 cards were removed because they were not rated as very or extremely relevant by at least four (66%) raters. These 30 cards included 22 cards from the leisure category, one from social participation, four from IADL, and three from health management. The majority of cards that were removed after the first stage of content validity were leisure cards that content experts believed to be too specific to be relevant to the larger population of at-risk adolescents and young adults.

Table 1

Content Validity Index

Cards	Cards receiving a rating of 3 or 4 by 66% of the content experts		Content Validity Index (*CVI*) calculation for each retained card			Final Retained or Modified Cards
	Retained	**Removed**	***CVI***	**Retained**	**Removed**	
Leisure						
1. spending time with animals	x		0.83	x		spending time with animals
2. playing musical instruments, singing	x		0.66		x	
3. reading		x				
4. attending live sporting events		x				
5. making crafts or jewelry		x				
6. playing board or card games	x		0.66		x	
7. gaming	x		0.83	x		gaming
8. drawing, painting	x		0.83	x		exploring creative talents (art, music, writing, singing, acting, etc.)
9. puzzles, crosswords		x				
10. photography		x				
11. skateboarding, rollerblading		x				
12. tv, movies, YouTube	x		1.00	x		tv, movies, YouTube, reading
13. listening to music	x		1.00	x		listening to music
14. news and current events		x				
15. going to movies		x				
16. computer programming		x				
17. dancing	x		0.66		x	

Cards	Cards receiving a rating of 3 or 4 by 66% of the content experts		Content Validity Index (*CVI*) calculation for each retained card			Final Retained or Modified Cards
	Retained	Removed	*CVI*	Retained	Removed	
18. watching sports	x		0.66		x	participating in sports or exercise (team sports, running, walking, yoga, Pilates, martial arts, etc.)
19. hiking, rock climbing		x				
20. going to live concert or shows	x		0.66		x	
21. going to community center or neighborhood park	x		1.00	x		going to community center or neighborhood park
22. taking a class online or in community	x		1.00	x		taking a class online or in community
23. gardening		x				
24. spending time alone	x		0.83	x		spending time alone
25. traveling		x				
26. exploring nature or parks	x		0.66		x	
27. fishing, hunting		x				
28. model-making, building, woodworking		x				
29. volunteering, supporting a cause	x		0.66		x	
30. ceramics, sculpture		x				
31. yoga, Pilates		x				
32. martial arts		x				
33. meditation, mindfulness	x		0.66		x	
34. visiting zoo, aquarium, museum	x		0.66		x	
35. enjoying snow		x				
36. enjoying water	x		0.66		x	
37. sewing, needlework		x				
38. cycling		x				
39. running/walking	x		0.66		x	
40. camping		x				
41. exploring own cultural heritage		x				
Social Participation						
42. spending time with friends	x		1.00	x		spending time with friends
43. playing sports with others	x		0.83	x		playing sports with others
44. attending social gatherings	x		0.83	x		attending social gatherings
45. attending family gatherings	x		1.00	x		attending family gatherings
46. going on adventures with friends or groups	x		0.83	x		going on adventures with friends or groups
47. dating, exploring new partners	x		1.00	x		dating, exploring new partners
48. spending time with my partner	x		1.00	x		spending time with my partner
49. social media, blogs, internet forums	x		0.83	x		social media, blogs, internet forums
50. meeting new people, attending meet up	x		0.66	x		
51. using phones, texting, communicating	x		1.00	x		using phones, texting, communicating
52. participating in performing arts		x	0.66	x		

Cards	Cards receiving a rating of 3 or 4 by 66% of the content experts		Content Validity Index (CVI) calculation for each retained card			Final Retained or Modified Cards
	Retained	**Removed**	**CVI**	**Retained**	**Removed**	
53. playing music with friends, band	x					
54. participating in group, club	x		1.00	x		participating in group, club
School						
55. exploring college/career	x		1.00	x		exploring college/career
56. studying, homework	x		1.00	x		studying, homework
57. writing papers, reports	x		0.83	x		writing papers, reports
58. applying to schools	x		0.83	x		applying to schools
59. paying attention in class	x		0.83	x		paying attention in class
60. taking tests	x		0.83	x		taking tests
61. calendar, day planning	x		0.83	x		calendar, day planning
62. taking notes	x		0.83	x		taking notes
63. submitting assignments on time	x		0.83	x		submitting assignments on time
64. participating in extracurricular activities	x		0.66		x	
65. being on time for school, class	x		1.00	x		being on time for school, class
Work						
66. completing work assignments	x		1.00	x		completing work assignments
67. applying for jobs	x		1.00	x		applying for jobs
68. going on interviews	x		1.00	x		going on interviews
69. writing a resume	x		1.00	x		writing a resume
70. professional, career development	x		1.00	x		professional, career development
71. communicating with co-workers	x		0.83	x		communicating with co-workers
72. meeting job demands	x		0.83	x		meeting job demands
73. being on time for work	x		0.66		x	being on time for work
74. interacting with supervisors, leaders	x		1.00	x		interacting with supervisors, leaders
75. supervising, managing others	x		0.66		x	
IADLs						
76. cleaning laundry	x		1.00	x		cleaning laundry
77. garbage recycling	x		0.66		x	
78. cleaning dishes	x		1.00	x		cleaning dishes
79. caring for pets	x		0.66		x	
80. moving and maintaining a home	x		0.83	x		moving and maintaining a home
81. shopping	x		0.83	x		shopping
82. paying bills	x		0.66		x	
83. managing money	x		1.00	x		managing money and paying bills
84. childcare	x		0.66		x	
85. planning and managing transportation	x		0.83	x		planning and managing transportation
86. getting around community	x		1.00	x		getting around community
87. food prep, cooking	x		1.00	x		food prep, cooking
88. emergency, safety planning	x		1.00	x		emergency, safety planning
89. caring for others		x				
90. spiritual practice		x				
91. entertaining		x				
92. cleaning	x		1.00	x		cleaning
93. driving	x		1.00	x		driving

Cards	Cards receiving a rating of 3 or 4 by 66% of the content experts		Content Validity Index (*CVI*) calculation for each retained card			Final Retained or Modified Cards
	Retained	Removed	*CVI*	Retained	Removed	
94. car maintenance		x				
95. organizing and maintaining possessions	x		0.83	x		organizing and maintaining possessions
ADLs						
96. grooming hygiene	x		1.00	x		grooming hygiene
97. dental care	x		1.00	x		dental care
98. hair care	x		1.00	x		hair care
99. bathing showering	x		1.00	x		bathing showering
100. eating drinking	x		1.00	x		eating drinking
101. dressing	x		1.00	x		dressing
102. toileting and hygiene	x		0.83	x		toileting and hygiene
103. sleep preparation	x		0.83	x		sleep preparation
104. sleeping	x		0.83	x		sleeping
Health Management						
105. managing health care appointments	x		1.00	x		managing health care appointments
106. managing medication	x		1.00	x		managing medication
107. exploring gender identity	x		0.66		x	exploring gender identity
108. exploring sexual identity	x		0.83	x		exploring sexual identity
109. exercise, physical activity	x		1.00	x		exercise, physical activity
110. resting, napping	x		0.66		x	
111. managing emotions and stress	x		1.00	x		managing emotions and stress
112. managing symptoms and conditions	x		1.00	x		managing symptoms and conditions
113. sexual activity and intimacy	x		0.83	x		sexual activity and intimacy
114. managing gambling, lotto		x				
115. managing smoking, vaping		x				managing smoking, vaping
116. managing nutrition	x		0.66		x	managing nutrition
117. managing personal care items	x		1.00	x		managing personal care items
118. managing alcohol	x		0.66		x	managing alcohol
119. communicating with health providers, caregivers	x		1.00	x		communicating with health providers, caregivers
120. managing drug use		x				managing drug use
121. using birth control and safe sex practices	x		1.00	x		using birth control and safe sex practices

After the second stage of content validity in which a *CVI* for each retained card was established, an additional 24 cards were removed because they did not receive a *CVI* of at least 0.83 (meaning that five or more content experts did not rate that card as very or extremely relevant). These removed cards included 11 from the leisure category, two from social participation, one from school, two from work, four from IADL, and four from health management. The content experts suggested that several cards from the leisure category should be combined or collapsed into higher-order categories that could encompass broader areas of leisure participation. For example, they suggested combining nine of the cards that each addressed a specific creative talent into one card: "exploring creative talents" (e.g., art, music, singing, acting). Similarly, they suggested combining eight of the cards that each addressed sports or physical exercise into

one card: "participating in sports or exercise" (e.g., team sports, running, walking, yoga, Pilates, martial arts).

Regarding the social participation category, the content experts believed that many at-risk adolescents and young adults were unable to participate in extracurricular school events (card 64) because of outside responsibilities, including work, and rated this card as invalid. They also believed that the card "supervising/managing others" was not as relevant to this age group, whom they expressed are more likely applying for or employed in jobs in which they are supervised. It is unclear why the card "being on time for work" was not rated as very or extremely relevant by five or more (83%) of the content experts, particularly since the card "being on time for school/class" was rated as very or extremely relevant by all six content experts. The content experts may have believed that school is an occupation that a majority of this age group participates in, while work may not be. However, because the literature identifies work skills as a priority for at-risk adolescents (DeLuca et al., 2015), we chose to retain this card in the final card compilation.

Six cards were removed from the health management category in the first and second stages of content validity: "exploring gender identity," "managing gambling/lotto," "managing smoking/vaping," "managing nutrition," "managing alcohol," and "managing drug use." The reasons for the removal of the latter five cards by the content experts were not provided in the open-ended comment sections. The content experts may have believed that these problems were not shared by the populations of at-risk adolescents with whom they were currently working. We maintained these latter five cards, however, because of the large amount of literature that identifies addiction (in the form of alcohol, substance, and nicotine use) as a primary harmful occupation for at-risk adolescents and young adults (Chang et al., 2018; Milot Travers & Mahalik, 2021; Rømer Thomsen et al., 2018). We additionally decided to maintain the card "managing nutrition" since nutrition is frequently compromised by the effects of addictive behaviors, and nutritional knowledge has been identified as important for at-risk youth who are attempting to make healthy lifestyle changes (Spero et al., 2019).

One content expert stated that while the card "exploring gender identity" was important, it was only relevant to youth who identified as gender diverse. Yet, researchers suggest that a disproportionate percentage of gender-diverse adolescents and young adults (20%–40%) become homeless because of family and school rejection, abuse, and employment and housing discrimination (Hail-Jares et al., 2021). Because the community of gender diverse youth and young adults has been historically ostracized from the larger heteronormative society, including the health care system, and because a primary objective of the revised Visual Activity Sort was to develop a set of cards that would be inclusive of a diverse group of people, we decided to maintain this card in the final card compilation.

In the final stage of establishing content validity, a summary *CVI* was calculated for the final card selection based on the number of cards that were endorsed by the content experts (n = 68) divided by the number of cards that were maintained (n = 74). The final summary *CVI* was 0.91 at a 0.05 significance level, which Lynn (1986) identifies as high.

When asked if the cards reflected a diversity of race, ethnicity, gender, gender orientation, socioeconomic level, and disability status, the content experts unanimously believed that the cards proficiently portrayed diversity. The content experts were also asked to identify topics that they perceived to be missing from the revised Visual Activity Sort cards. In response to this question, the content experts suggested cards that addressed setting and maintaining healthy boundaries, social media and internet

safety (protection of personal information), and navigating governmental agencies (such as the Department of Motor Vehicles, Social Security Disability Income, and Housing of Urban Development). We will develop these cards and assess their appropriateness in a future study.

Interrater Reliability

Fifteen students from a charter school for at-risk adolescents in a large, socioeconomically depressed urban area participated in establishing interrater reliability. The participants ranged in age from 16 to 19 years (16, n = 1; 17, n = 9; 18, n = 4; 19, n = 1) and all were in high school. The participants self-identified as male (n = 7), female (n = 8), African American (n = 14), Puerto Rican (n = 1), Hispanic (n = 2), and non-Hispanic (n = 13).

Each participant was administered the revised Visual Activity Sort on two occasions, 1 week apart, by two trained raters. Interrater reliability among Raters 1 and 2 was found to be high (ICC = 0.83, $p < 0.000$) (see Table 2).

Table 2
Interrater Reliability: Participant Summed Scores*

	Rater 1			Rater 2		
Participant	Summed Scores	*M*	*SD*	Summed Scores	*M*	*SD*
1	323	2.83	1.19	314	2.75	1.20
2	281	2.46	0.98	281	2.46	0.98
3	290	2.54	0.99	288	2.52	1.04
4	303	2.65	1.05	311	2.72	1.04
5	362	3.17	0.92	323	2.83	0.88
6	383	3.35	1.24	313	2.74	1.10
7	303	2.65	1.23	302	2.64	1.18
8	280	2.45	1.03	270	2.36	0.98
9	281	2.46	1.12	277	2.42	1.09
10	288	2.52	1.14	284	2.49	1.09
11	290	2.49	1.09	324	2.84	1.12
12	314	2.75	0.95	300	2.63	0.69
13	328	2.87	1.02	322	2.82	0.98
14	366	3.21	1.12	373	3.27	1.11
15	388	3.40	1.37	383	3.35	1.37

Note. *Summed scores were calculated by compiling the 114 items from each participant's Visual Activity Sort.

Intra-rater Reliability

A different set of 15 students from the same charter school for at-risk adolescents participated in the establishment of intra-rater reliability. The participants ranged in age from 16 to 20 years (16, n = 3; 17, n = 6; 18, n = 3; 19, n = 1; 20, n = 2) and all were in high school. The participants self-identified as male (n = 8), female (n = 5), bisexual (n = 2), African American (n = 11), Dominican (n = 4), Hispanic (n = 5), and non-Hispanic (n = 10).

The revised Visual Activity Sort was administered to each participant by the same rater on two separate occasions, 1 week apart. Intra-rater reliability was found to be high, with an ICC of 0.84, $p < 0.000$ (see Table 3).

Discussion

One objective of this study was to determine if the revised Visual Activity Sort for At-Risk Adolescents and Young Adults possessed content validity for a population of at-risk adolescents and young adults. When we revised the assessment, we aimed to modify the card images to be more reflective of diversity and more representative of the activities common to this population. While the six content experts unanimously indicated that the card images adequately reflected diversity of race, ethnicity,

gender, gender orientation, socioeconomic level, and disability status, they also expressed that the majority of the leisure activity cards were too specific to represent the unique leisure interests of individuals from diverse cultural backgrounds.

Table 3
Intra-rater Reliability: Participant Summed Scores*

| Participant | Administration 1 | | | Administration 2 | | |
	Summed Scores	*M*	*SD*	Summed Scores	*M*	*SD*
1	312	2.73	1.06	312	2.73	1.03
2	306	2.68	1.05	318	2.78	1.06
3	303	2.65	1.11	308	2.70	1.08
4	333	2.92	1.10	324	2.84	1.00
5	338	2.96	0.96	319	2.79	1.02
6	326	2.85	0.99	290	2.54	0.85
7	327	2.86	1.06	335	2.93	0.87
8	249	2.18	1.03	245	2.14	1.04
9	365	3.20	1.29	352	3.08	1.23
10	314	2.75	1.00	304	2.66	0.92
11	301	2.64	1.10	303	2.65	1.15
12	290	2.54	1.27	266	2.83	1.03
13	270	2.36	1.34	263	2.30	1.28
14	331	2.90	1.16	314	2.75	0.94
15	277	2.42	1.21	290	2.54	0.96

Note. *Summed scores were calculated by compiling the 114 items from each participant's Visual Activity Sort.

Of the 41 leisure activity cards, the content experts recommended removing or combining 33 cards, leaving nine leisure cards. Several of the leisure cards were collapsed into the larger categories of "exploring creative talents" and "participating in sports or exercise." Cards such as cycling, playing board games, making crafts or jewelry, puzzles/crosswords, photography, skateboarding/rollerblading, going to movies, computer programming, hiking/rock climbing, going to live concerts or shows, traveling, fishing/hunting, and camping may have reflected the occupations of youth from higher socioeconomic levels and with access to costly equipment, transportation, and parks beyond urban locations. These cards may also reflect the biased lenses through which the authors compiled activities in the leisure category. Grenier (2020) suggests that many occupational therapy assessments, as is true of most professions' instruments, may be inherently biased because they were developed by a dominant white middle-class group based on that group's cultural norms and values. Grenier also suggests that it is difficult for instrument developers to be aware of the ways in which their biased lenses effect the cultural sensitivity of an assessment without systematic analysis by an external panel of diverse content experts.

In retrospect, it is clear that we selected leisure activities that were common to adolescents and young adults with access to monetary and transportation resources. The nine remaining leisure cards (spending time with animals; gaming; exploring creative talents; tv, movies, and YouTube; reading; listening to music; participating in sports or exercise; going to a community center or neighborhood park; taking a class online or in the community; spending time alone) were identified by the content experts as activities that were common to at-risk youth, represented broader categories of occupations under which could fall leisure activities that would be specific to an individual's own interests and were accessible to groups with minimal economic resources.

One of the most surprising findings was the content experts' suggestion to remove six cards from the health management section (exploring gender identity, managing gambling/lotto, managing smoking/vaping, managing nutrition, managing alcohol, and managing drug use). As noted in the Results

section, because the content experts did not provide written comments about five of these cards specifically, it was unclear why they deemed them to be content invalid for at-risk youth. One content expert stated that "exploring gender identity" was only valid for those identifying as gender diverse; however, the content experts may not have been aware that a disproportionate percentage of gender-diverse youth become homeless because of family and school rejection (Hail-Jares et al., 2021).

This lack of awareness regarding the discrimination that gender-diverse youth encounter and that commonly leads to homelessness, mental health concerns, and substance use (Mountz & Capous-Desyllas, 2020) is suggested by researchers to be a common oversight by health care professionals in Western, heteronormative societies (Robinson 2020, 2021). There was only one content expert of the six who identified as gender diverse. In retrospect, we acknowledge that we should have sought to recruit at least three content experts who identified as members of the LGBTQIA community. Without direct and equal representation from the gender-diverse community, the content experts likely did not possess sufficient knowledge to make informed recommendations about the meaningfulness of cards to this group. As such, and based on the growing literature identifying gender-diverse youth as disproportionately at-risk for homelessness and school failure, we chose to maintain the card "exploring gender identity."

It is similarly unclear why the content experts recommended the removal of the cards "managing smoking/vaping," "managing alcohol," and "managing drug use." One objective of our revision of the Visual Activity Sort was to include unsanctioned occupations that were known to be common to at-risk youth, based on a large amount of research literature (Chang et al., 2018; Milot Travers & Mahalik, 2021; Rømer Thomsen et al., 2018). While most of our content experts were health care professionals or students in the school system, we omitted experts with knowledge of unsanctioned activities common to this group based on their work in the juvenile justice system, law enforcement, homeless youth shelters, and adolescent recovery programs. Such an omission may have accounted for the lack of endorsement for the above-noted cards. As such, and because of the large amount of literature identifying smoking/vaping and substance use as common harmful behaviors of at-risk youth, we maintained them in the final card selection. We did, however, remove the card "managing gambling/lotto" since researchers suggest that substance use and social media and internet addictions are now significantly more prevalent among at-risk youth than gambling (Calado et al., 2017). Although the content experts suggested adding a card addressing social media and internet safety, it may be equally important to include a card about managing social media and internet addictions.

In retrospect, we recognize that using the term "managing" (i.e., "managing" drug and alcohol use) may have been unclear to the content experts. The term "managing" may convey ideas that someone is both aware of an existing problem and can discern whether they possess skills sufficient to rectify identified problems. Such insight may be developmentally difficult for adolescents and young adults without prior counseling. The term "managing" may also be more reflective of White middle-class values and goals and, therefore, may be inherently biased. It would be important to understand the content experts' thoughts about use of the term "managing" and revise these cards' labels accordingly.

The content experts also suggested two additional cards addressing setting and maintaining healthy boundaries and navigating governmental agencies (e.g., Department of Motor Vehicles, Social Security Disability Income, and Housing of Urban Development), both of which appear to be important occupations for at-risk youth and should be developed and assessed for content validity in a future study.

A second objective of this study was to determine whether the revised Visual Activity Sort (with 74 cards) possessed inter- and intra-rater reliability. Using two trained raters, inter- and intra-rater reliability were found to be high with *ICCs* of 0.83 and 0.84, respectively. These high levels of inter- and intra-rater reliability indicate that the Visual Activity Sort is able to identify daily life activities that are most important to at-risk youth by multiple and single raters over time and can be used to measure participants' perceived participation, motivation, satisfaction, and competency prior to and after occupational therapy intervention.

Limitations

One limitation of this study was the possible lack of range of knowledge possessed by the content experts, who were all school-based professionals working with at-risk youth. In retrospect, content experts should also have been recruited from law enforcement, the juvenile justice system, homeless youth shelters, and adolescent recovery programs. Content experts from these latter professions may have contributed broader insight regarding the unsanctioned occupations of at-risk adolescents and young adults.

We also acknowledge that our content experts could have better represented a population of at-risk adolescents and youth. Four of the six content experts were White. The only content experts who identified as Black were the two students attending the charter school for at-risk youth. A greater number of content experts who identified as Black and who, at some point in their lives, experienced socioeconomic disadvantage, may have provided a more accurate assessment of the Visual Activity Sort cards. Similarly, having an equal number of content experts who were currently members of a Black and Brown at-risk youth population and adult professionals who worked with at-risk youth may also have yielded a less culturally-biased analysis of the cards.

We acknowledge, too, that we should have recruited at least three content experts who identified as gender diverse to provide adequate representation and knowledge of the needs and experiences of at-risk, gender-diverse youth. Content experts with this awareness may have been better able to offer feedback about the unique occupational participation needs and experiences of at-risk, gender-diverse youth. It is likely that such content experts would have possessed knowledge of the discrimination and rejection that this population has traditionally experienced. It is equally likely that such content experts may not have rated the card "exploring gender identify" invalid.

The parameters of this study included speaking English as a criterion for participation to promote feasibility; however, we recognize that a large population of at-risk adolescents and young adults are not English-speaking (Federal Interagency Forum on Child and Family Statistics, 2021). This group of non-English speaking, at-risk adolescents and young adults possess an added layer of intersectionality that likely adversely impacts their ability to access and participate in desired occupations. Including non-English speaking, at-risk adolescents, and young adults in studies assessing the psychometric properties of the Visual Activity Sort is critical to attaining an understanding of the unique barriers and challenges to desired occupational participation for this group and should be part of future studies.

A final limitation of this study was the small sample size of 30 participants, 15 for both the interrater and intra-rater reliability components of this study. Although the 15 participants in each reliability sub-study were a different set of participants, a larger sample size may have yielded more accurate data. Nevertheless, each type of reliability was analyzed by comparing the 114 scale items from

participants' Visual Activity Sort assessments. In other words, for each type of reliability, 1,710 items were compared between the first and second administrations.

Future Research

In future research, we plan to develop and add the following cards to the 74 rated as content valid in the present study: social media and internet safety (health management), setting and maintaining healthy boundaries (health management), managing social media and internet use and addiction (health management), and navigating government agencies (IADLs). We will then reassess content validity with a new panel of content experts working with at-risk youth from a range of settings, including the school system, law enforcement, juvenile justice system, homeless youth shelters, and adolescent recovery programs. In addition, we will construct a panel of content experts who better represent Black and Brown socioeconomically disadvantaged communities. We will likewise seek an equal number of content experts identifying as gender diverse and gender conforming to provide a more balanced view of meaningful occupations for at-risk youth. Once content validity is reestablished, inter- and intra-rater reliability will also be re-examined.

Implications for Occupational Therapy Practice

The revised Visual Activity Sort for At-Risk Adolescents and Young Adults provides a valid and reliable instrument to assess the occupational participation needs of this population in the areas of ADLs, IADLs, health management, social participation, work, school, and leisure. School- and community-based occupational therapists can use the Visual Activity Sort to understand the unique needs of at-risk youth and provide authentic intervention that addresses their most meaningful concerns in the primary environments in which they carry out their daily life occupations. School-based therapists, in particular, can confidently assess the needs of and provide intervention for at-risk youth that authentically supports successful participation in the student role and transition to post-secondary occupations, including further education and training, work, and independent living. In this way, the Visual Activity Sort has the potential to both identify at-risk adolescent students who could benefit from occupational therapy services and prevent this group's premature discharge from therapists' caseloads resulting from a lack of awareness of their most critical needs.

Conclusion

A primary aim of the revision of the Visual Activity Sort for At-Risk Adolescents and Young Adults was to develop a set of cards that would be representative of the occupations of at-risk youth and reflective of diversity (with regard to race, ethnicity, gender, gender orientation, socioeconomic level, and disability status). It was also important to us to develop cards that included images of unsanctioned occupations that were identified by research literature as common to at-risk youth. The results of the present study suggest that the culminating set of 74 selected cards possessed a final summary *CVI* of 0.91 and were endorsed as content valid. Both inter- and intra-rater reliability were also found to be high, with *ICCs* of 0.83 and 0.84, respectively. Future research, however, must assess four additional cards suggested by the content experts and authors (i.e., social media and internet safety, setting and maintaining healthy boundaries, managing social media and internet use and addiction, and navigating government agencies). This study confirms the unique contribution of the revised Visual Activity Sort as a card sorting assessment for at-risk adolescents and young adults that contains images that better reflect the clients who will use the assessment and their sanctioned and unsanctioned occupations.

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