Young Adult Routines Inventory (YARI): Development and Initial Validation

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Abstract

Young adulthood is characterized by important life transitions (e.g., college, employment, relocation, marriage), where time management skills and routines help promote positive adjustment. Routines are observable, repetitive behavior that are context specific and automate aspects of daily life (e.g., personal hygiene, health, occupational, academic). Although measures of routines exist for children, adolescents, and older adults, similar measures assessing young adult routines are lacking. The purpose of this study was to develop and initially validate The Young Adult Routines Inventory (YARI). Analyses revealed a four-factor measure reflecting daily routines, social routines, time management, and procrastination. The YARI demonstrates good internal consistency, construct, and convergent validity, and was positively correlated with measures of emotional well-being and perceived life satisfaction. The YARI was negatively correlated with self-reported symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) and successfully distinguished individuals with and without ADHD symptomatology. Preliminary evidence suggests the YARI is a promising measure of young adult routines.

Keyword Routines · Time management · Young adults · Rating scale · Assessment

Routines are defined as observable behavior that occur in about the same order, at the same place and around the same time, on a consistent (e.g., daily, or weekly) basis (Jensen et al., 1983; Sytsma et al., 2001). Routines are context specific, repetitive, and conserve cognitive and physical resources by automating aspects of daily life (Zisberg et al., 2007). Routines can provide a sense of stability and predictability for children and adults alike (Kiser et al., 2005; Lindstedt & Umb-Carlsson, 2013). Typical routines for adults include those involving sleep, meals, social relationships, personal hygiene, and health, chores as well as those necessary for meeting occupational or academic demands (e.g., studying, task management, arriving on time and with necessary materials).

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The benefits of routines are well documented in the literature. Routines are thought to strengthen family bonds; promote self-esteem, improve emotional stability, and enhance well-being (Koome et al., 2012; Zisberg, et al., 2009). Routines have been shown to serve as a protective factor against mental illness; and are an indicator of overall functioning throughout the lifespan (Barton et al., 2019; Koome et al., 2012; Zisberg et al., 2009). Increased frequency and consistency of routines are often recommended to parents seeking advice for mitigating their child's psychological or behavioral concerns and may even account for differences in symptom severity (Kiser et al., 2005; Lanza & Drabick, 2011). Emerging work during the current COVID-19 pandemic has also revealed that routines, such as increased family meals, have a positive impact on psychological well-being for young adults (Berge et al., 2021), as well as for children and adolescents (Dvorsky et al., 2021; McRae et al., 2020). Several comprehensive measures of routines exist for children and adolescents (e.g., Jensen et al., 1983; Piscitello et al., 2019; Sytsma et al., 2001); however, similar measures for young adults are non-existent.

As young adults progress through their 20 s and 30 s, they typically experience life-changing events such as moving from the family home, attending college, entering the workforce, getting married, and having children that may disrupt

rhythms of daily living. Previous research has defined young adulthood in a variety of ways. Some researchers (e.g., Arnett, 2000) conceptualize young adults as those aged 18 to 25, while others (e.g., Atwood & Scholtz, 2008; Bentley, 2007) have extended the range to capture individuals in their 30 s and up to 40 years of age. Defining young adulthood as ages 18 to 35 allowed the current research to capture a wide range of nuanced stages of transition within the phase of early adulthood (e.g., single/in a relationship/married, with/ without children, college/career).

Young adults are expected to care for themselves and their belongings, prioritize commitments, and manage their time effectively. However, these skills can prove difficult to develop and maintain in the absence of external structure provided by authority figures (e.g., parents, teachers, and coaches). Mirsa and McKean (2000) found, for example, that effective time management had a greater buffering effect on anxiety and academic stress in college students than did increased leisure activities. Further, the use of time management strategies was associated with academic achievement and personal success in college (Britton & Tesser, 1991; George et al., 2008), rendering the skill set valuable for the well-being of young adults.

Time management, a method of monitoring and controlling time expenditure with the goal of increasing task efficiency, is necessary for successful adherence to routines. In turn, managing time efficiently requires skills in goal setting, prioritizing, and self-regulation (Claessens et al., 2007). These concepts intersect with the broader construct of executive functioning (EF). EF processes are necessary to plan and execute goal-directed behavior, to adapt to novel situations, and to self-regulate. As such, EF processes boast expansive influence over the daily lives of individuals. Poorer EF has been related to health difficulties such as obesity, poor treatment adherence, and substance abuse (Diamond, 2013; Stilley et al., 2010); whereas better EF is associated with improved quality of life and greater success in school and work (Diamond, 2013; Dvorsky & Langberg, 2014). Such deficits in EF are common among individuals with Attention-Deficit/Hyperactivity Disorder (Barkley, 1997; Barkley et al., 1997, 2001; Nigg, 2013a, b; Willcutt et al., 2005) and other psychological disorders.

The impact of maintaining daily routines on psychological and physical health in adults is widely recognized (Margraf et al., 2016). For example, Lindstedt and Umb-Carlsson (2013) evaluated the benefits of cognitive assistive technology products (e.g., key or object finders, pill dispensers, weekly schedules, electronic planning devices, and watches or alarm clocks) for adults with ADHD across daily environments. Of the products tested, weekly schedules and watches were found to be the most valuable to participants, which are items frequently employed in time management and adherence to routines (Lindstedt & Umb-Carlsson, 2013). Despite the importance

of routines and time management, research related to young adult self-regulatory activities is limited. In part, this may be due to the fact that few assessment tools have been developed specifically to measure routines and time management skills in young adult populations.

Many of the existing measures of routines for young adults are retrospective or ask individuals to report on routines related to their family of origin (e.g., The Stability of Activities in the Family Environment (SAFE); Israel et al., 2002), which inadequately accounts for current routines away from the family home. Other measures include daily diaries (e.g., Social Rhythm Metric (SRM); Monk et al., 1990), which can be time intensive and burdensome for participants. For example, the SRM requires daily recording for two weeks, which is impractical or unnecessary for obtaining a valid assessment of routines. Further, the SRM does not account for less frequent routines such as paying bills or attending meetings.

Other measures related to time management and routines include The Barkley Deficits in Executive Functioning Scale (Barkley, 2011), a measure used to assess commonly cited constructs of EF in adults (i.e., inhibition, working memory, organization, problem solving, time management, and self-regulation of emotions; Barkley, 2011, 2012). Similarly, Duggan et al. (2018) developed a valid and reliable screener of EF in young adults based on the college version of the Behavioral Assessment System for Children (Reynolds & Kamphaus, 2004). The screener assesses EF behaviors such as problem solving, attentional control, behavioral control, and emotional control. Although these are strong measures of functional impairment caused by EF deficits in adults, they do not capture specific daily routines that can be utilized in intervention planning and treatment monitoring.

Additionally, there are several measures that specifically assess time management, but do not address specific daily routines. These measures include the Time Management Questionnaire (TMQ; Britton & Tesser, 1991), Time Management Behavior Scale (TMB; Macan et al., 1990), and Time Structure Questionnaire (TSQ; Bond & Feather, 1988). The TMQ and the TMB, for example, are limited in that these measures were developed for use with college students and thus, do not include items relevant to young adults who are not students. Additionally, the TMB's inconsistent factor structure and low subscale reliability estimates are significant limitations to this measure (Hellsten, 2012; Mudrack, 1997).

Current Study

The goal of the current study was to address the gap in the literature by developing a measure of common routines and time management activities in young adults: The Young

Adult Routines Inventory (YARI). Similar to measures of routines in younger samples (e.g., Harris et al., 2013; Piscitello et al., 2019; Sytsma et al., 2001), we hoped this measure would have a secondary benefit in differentiating adults with and without ADHD thus providing useful information for targeted interventions. Based on measures of routines in adolescents (i.e., Adolescent Routines Questionnaire; Piscitello et al., 2019) and older adults (i.e., Scale of Older Adults' Routines; Zisberg et al., 2009) which both resulted in a five-factor structure, we predicted that the current measure would also consist of five factors. Predicted factors included: Daily Living Routines (e.g., sleep/wake schedule, meals, hygiene), Organizational/Instrumental Routines (e.g., chores, vehicle maintenance, managing money), Health Related Activities (e.g., exercise, medical appointments, substance use), Social/Leisure Routines (e.g., talking with family or friends, engaging in outside activities), and Time Management Routines (e.g., attending events on time, prioritizing important activities, scheduling).

Additionally, it was predicted that the frequency of routines endorsed by young adults would be positively correlated with time management, perceived life satisfaction, and positive mental health. Also, the frequency of routines endorsed by the participants is expected to be negatively correlated with ADHD symptoms. As such, we predicted that adults with self-reported ADHD would endorse fewer routines and less frequent use of time management strategies than those without ADHD. Similarly, it was expected that the YARI scores would distinguish those with self-reported ADHD from those without ADHD.

Phase I: Item Generation and Measure Development

Procedure

A pool of items was generated with the goal of capturing typical routines for young adults, including both students and working adults. The item pool was produced using descriptive reports from young adults, reworded items extracted from existing scales measuring routines in adolescents and older adults, and a review of the relevant literature. Item generation utilized theorized dimensions of routines based on previous literature, along with time management-related routines and resulted in 80 items. After removing items which applied only to students, 72 items remained.

Experts were recruited to judge the content and face validity of the item pool (Clark & Watson, 1995; Netemeyer et al., 2003). Based on initial feedback from a professor and two advanced graduate students in clinical psychology, similar items were combined, and several irrelevant or redundant items were deleted, reducing the pool to 67 items. After

being briefed on the rationale for the measure, seven additional graduate students and a professor reexamined the item pool. This group suggested revisions, items to delete due to redundancy, and recommended additional items. Reviewers rated items based on the extent to which they agreed the content was relevant and suitable to the construct (i.e., whether the item represented a routine experienced by young adults), on a scale of 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Items with below average ratings (i.e., less than 3) were eliminated. This resulted in 54 items total, with between seven and sixteen items retained to account for each hypothesized factor.

Phase II: Initial Factor Structure and Reliability

Participants

After receiving IRB approval, participants were recruited through undergraduate psychology classes, social media, word-of-mouth, and websites which allow advertisement of research studies (e.g., Craigslist). Participants included 492 adults aged 18 to 35. Of those, 389 participants (79%) completed the questions and passed the embedded validity checks included in the survey. Attrition and careless responding are well-documented risks when using online surveys and may be attributable to fatigue from long survey instruments, or increased anonymity and distraction (Huang et al., 2012; Ward et al., 2017). Therefore 103 participants were removed from the final sample due to attrition and careless responding. There were no significant differences on demographic variables between those who were included and those who were excluded. The sample was considered sufficiently large enough to conduct the analyses, as a sample size of 300 is often recommended (Clark & Watson, 1995; DeVellis, 2017).

The final sample ($N = 389$) was predominantly female (77.6%) and White (85.9%), with 5.9% identifying as African American/Black, 4.4% Asian/Pacific Islander, and 3.9% other. The mean age for the sample was 24.17 ($SD = 5.43$); 59.4% were students. The majority of the sample (66.8%) reported no previous psychological diagnoses, with the most common self-reported disorders being anxiety-related disorders (9.0%), ADHD (6.7%), and mood-related disorders (3.6%). The majority of the sample reported working parttime (37.8%) or full time (35.5%) and a minority were employed (26.7%). The sample was diverse in terms of income, as a majority (68%) of the sample reported making less than $50,000 USD/year, with 11.1% reported making between $50,000-$74,999, 8.0% made between $75,000 and $99,999, and 12.6 reported making over $100,000/year. Participants reported a range of educational backgrounds

with < 1% reported having less than high school, 22.4% reported completing high school, 30.1% had some college, 2.6% received an Associate Degree, 24.9% received a Bachelor Degree, and 19.6% received a graduate or professional degree.

Measures

Demographic Questionnaire

Participants completed a questionnaire which asked for basic information related to age, sex, marital/relationship status, education level, job/academic status, income, and mental health diagnoses.

Young Adult Routines Inventory (YARI) – Initial Version

Participants were presented with written definition of routines and time management (i.e., "Routines are events that occur regularly: at about the same time, in the same order, or in the same way every time. Routines are closely related to time management which is defined as behavior aimed at achieving an effective use of time while performing goal-oriented activities. Time management behaviors include those related to assessing, planning, and monitoring time use"). The definitions were provided to ensure the participants rated behavior they routinely engaged in, not simply activities that occur. Participants were asked to rate the 54 items retained in Phase I based on how often they engaged in the behavior over the last month, on a scale of 0 (*Never*) to 4 (*Almost always*).

Procedure

Prior to beginning the questionnaires, participants were presented with information about the study and completed informed consent procedures. Participants completed questionnaires using Qualtrics online survey software. Individuals recruited through the psychology department research recruitment pool received course credit for participation. All other participants were given the option of entering a raffle to win a gift card ($20) for their participation.

Statistical Analyses

All analyses were conducted in *R* (R Core Team, 2017) primarily using the *psych* package developed by Revelle (2017). Prior to conducting data analysis, items were screened for normality, skewness, and kurtosis. This examination showed that several items were skewed and kurtotic; however, these items were retained in analyses with no corrections, as some basic routines (e.g., hygiene routines, attending work) are not expected to be normally distributed in a community (i.e.,

mostly non-clinical) sample. Of note, the skewed and kurtotic items were ultimately eliminated during the factor analysis procedure because they also failed to load significantly onto any factor. Further, several participants were multivariate outliers based on their significant Malhalanobis distance scores. However, the participants were retained for analyses as it is expected that some adults have far more or far fewer routines and time management skills than others. Exploratory Factor Analysis (EFA) was conducted to determine the factor structure of the YARI and a parallel analysis was conducted to identify the maximum number of factors representing the data (Floyd & Widaman, 1995). Most of the data fell within the assumption of the normal distribution, so the chosen factor extraction method for both the parallel analysis and subsequent EFA was maximum likelihood (ML), which is a robust model fitting procedure (Costello & Osborne, 2005; Fabrigar et al., 1999). The results of the parallel analysis suggested the data could support up to twelve factors.

Results

Item Analysis

Initial item analyses included examination of item frequencies, item means, and inter-item correlations. Items that were endorsed infrequently (i.e., less than 15% of the time) or had item means which did not approach the median value for responses were considered for elimination (DeVellis, 2017). One item related to tobacco use was eliminated due to low frequency. Several items (e.g., I attend work/school obligations) had high means but were retained for further analyses because of their possible theoretical importance (Clark & Watson, 1995). Inter-item correlations were examined to evaluate redundant items. No items were eliminated as the correlation coefficients for item pairs were less than .7. Several items were reverse scored. Item-total correlations were also reviewed for correlation coefficients of items with the remainder of the scale if the individual item was dropped (DeVellis, 2017; Floyd & Widaman, 1995). This review highlighted several items that did not correlate highly with the overall scale; however, these items were retained to investigate how they may cluster and influence the exploratory factor analysis.

Exploratory Factor Analysis

Using the results of the parallel analysis, the remaining 53 items were factor analyzed using a 12-factor solution with ML extraction method and a promax rotation, a form of oblique rotation which allows factors to be correlated with one another. Multiple criteria have been suggested for determining the optimal number of factors to retain in a solution,

including factor loadings above .3 or .4, simple structure, and retaining factors with three or more items per factor (Costello & Osborne, 2005; Fabrigar et al., 1999; Floyd & Widaman, 1995). The resulting 12-factor solution had several factors with only two to three items loaded, several items which cross-loaded onto multiple factors, and was not interpretable.

All possible factor solutions with fewer than twelve factors were examined for comprehensiveness, and to determine which solution produced the most theoretically and empirically sound structure. Factor solutions with more than seven factors were found to be uninterpretable and possessed factors with few items as well as cross-loaded items. An additional two items were deleted due to not being theoretically cohesive with the remainder of the items, thus additional analyses were conducted after deleting these items. After examining the interpretability and item loadings of the remaining factor solutions, the most theoretically sound and interpretable solutions were 3-factor and 4-factor solutions.

The items that failed to load or loaded onto multiple factors for each of the remaining factor solutions were removed and the analyses were re-run with the reduced number of items. Again, the 3-factor and 4-factor solutions produced the most stable loadings with the fewest cross-loadings. The internal consistency for each factor, overall alpha values, and variance accounted for were compared between the 3-factor and 4-factor solutions. Although both solutions were very similar statistically, the 4-factor solution fit better with theoretical predictions, had a greater quantity of items loading onto each factor, and the relationship between factors was more cogent. As a result, a 25-item, 4-factor solution was chosen as the best fit for the data. This final structure accounted for 34.2% of the variance with Eigenvalues ranging from 1.47 to 2.46.

Factor loadings are presented in Table 1. Factor 1, *Daily Routines*, consists of seven items which represent routines that are daily regulatory activities, such as sleeping and eating. The internal consistency for the *Daily Routines* factor was $\alpha = .79$ ($\omega = .76$, 95% CI [.70, .80]). Factor 2, *Social Routines,* consists of seven items measuring communication, responsiveness, and participation in social activities. The *Social Routines* factor demonstrated adequate internal consistency ($\alpha = .73$; $\omega = .76$, 95% CI [.70, .81]). Factor 3, *Time Management,* consisted of five items related to timeliness and planning, which had adequate to good internal consistency ($\alpha = .72$; $\omega = .83$, 95% CI [.79, .86]). Of note this factor had one item that also loaded onto the *Daily Routines* factor, albeit weaker. Finally, Factor 4 was made up of six items related to productive activities and inversely scored items related to interference activities and was labeled *Procrastination.* For example, "I procrastinate on tasks I should complete" and "I put off doing laundry." This factor

demonstrated questionable internal consistency ($\alpha = .64$; $\omega = .65$, 95% CI [.59, .71]).; however, based on the developmental stage of the YARI no further items were deleted so as not to reduce the potential utility of the measure. The overall YARI demonstrated good internal consistency reliability ($\alpha = .81$; $\omega = .79$, 95% CI [.73, .83]) and the Tucker Lewis Index was equal to .829. Scale and composite means and standard deviations are reported in Table 2. Bivariate correlations between the subscales and composite ranged from weak to strong positive correlations (.12 < Pearson's r < .74).

Phase III: Initial Validity Analyses

Participants

Participants for this phase were a subset of those described in Phase II, who had completed all measures to satisfaction. The participants were 370 individuals between the ages of 18 and 35. The descriptive statistics for this sample do not meaningfully differ from those in Phase II.

Measures

Time Structure Questionnaire (TSQ; Bond & Feather, 1988)

The TSQ is a 26-item self-report measure that assesses the level to which individuals use their time in a structured and purposeful manner. Items are rated on a seven-point scale ranging from *Yes, always* to *No, never*. Some items are reverse scored, so that higher scores on the TSQ indicates more time structure. The TSQ items map onto five factors: structured routine, sense of purpose, present orientation, effective organization, and persistence. Items include questions such as "Do you find during the day that you are often not sure what to do next?" and "Do you think you do enough with your time?" The TSQ has been shown to demonstrate high internal consistency and is adequate stability over time (Bond & Feather, 1988). Reliability of the TSQ for this study was comparable that of other reports ($\alpha = .77$; Mudrack, 1997).

Satisfaction with Life Scale (SWLS; Diener et al., 1985

The SWLS measures global cognitive judgements of satisfaction with a person's life. The scale contains five items measured on a seven-point scale, ranging from *Strongly Disagree* to *Strongly Agree*. An exemplar from the measure is, "I am satisfied with my life." All items are totaled and

Table 1 Factors and factor loadings for young adult routines inventory

Item description	Factor			
	1	2	3	4
I eat meals at the same time every day	**.68**	−.08	.01	−.15
I plan my meals/snacks	**.68**	−.01	−.15	.02
I have a predictable schedule	**.57**	−.06	.15	−.08
I wake up around the same time every day	**.50**	−.08	.13	−.04
I go to bed at a time which allows an adequate amount of sleep	**.46**	−.18	.11	.12
I spend time planning my days or week	**.46**	.19	−.05	.15
I monitor my caloric intake or weight	**.40**	.15	−.22	.00
I spend time with friends or family regularly	−.09	**.76**	−.02	.08
I plan and/or participate in fun weekend activities	−.10	**.70**	−.03	.04
I talk to friends daily (in person or via phone/internet)	−.16	**.63**	.04	−.14
I talk with my parents or family members regularly	−.04	**.49**	.17	.01
I respond to calls in a timely manner	.01	**.45**	.11	.15
I participate in clubs or organizations	.04	**.42**	−.06	−.09
I volunteer my time or talents regularly	.16	**.36**	.01	−.08
I arrive on time for scheduled events with others	−.06	.06	**.76**	−.03
I arrive on time to obligations (e.g., class, meetings, work, appointments)	.01	.06	**.74**	.02
I am late for meetings or appointments*	−.11	−.03	**.71**	.02
I get dressed and ready in a timely manner	.24	.04	**.45**	.03
I wake up with enough time to get ready for the day[a]	**.36**	.02	**.43**	.00
I procrastinate on tasks I should complete*	.13	.03	.04	**.62**
Video games, internet, or television get in the way of my productivity*	−.01	.00	.06	**.56**
I put off doing laundry*	.15	−.05	−.07	**.40**
I depend on another adult for reminders (e.g., to make appointments or run errands)*	−.12	.00	.07	**.38**
I complete chores regularly	.19	.22	−.03	**.38**
Eigenvalue	2.46	2.40	2.22	1.47
% Variance	9.8	9.6	8.9	5.9

Factor 1 = Daily Routines; Factor 2 = Social Routines; Factor 3 = Time Management; Factor 4 = Procrastination

*indicates reverse-scored items

[a]indicates item which loaded onto two factors

Bolded font indicates items loadings >.30

interpreted so higher scores indicate greater life satisfaction. The SWLS has been translated into over 30 languages and was initially developed using two college student samples and a geriatric sample. The scale has one factor which accounts for 66% of the variance and has demonstrated good internal consistency (Diener et al., 1985). This measure has good test–retest reliability (Diener et al., 1985; Pavot & Diener, 2008). For the current study, reliability was estimated to be good (α = .89).

RAND 36-Item Health Survey 1.0 (SF-36; Hays et al., 1993)

The SF-36 is a self-report measure of overall health status and health-related quality of life. The SF-36 has eight subscales which measure: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to emotional problems, social functioning, emotional well-being, energy/fatigue, health perceptions, and one item

Table 2 Descriptive statistics of the YARI

Scale	Items	Min., Max	M	SD	Skew	Kurtosis	α	ω
Daily Routines	7	7, 29	19.31	4.47	−.15	−.38	.79	.76
Social Routines	7	10, 35	26.23	4.88	−.58	.23	.73	.76
Time Management	5	10, 25	20.93	3.47	−.79	.08	.72	.83
Procrastination	6	7, 28	17.74	3.83	.05	−.29	.64	.65
YARI Total	25	49, 109	84.21	11.13	−.26	−.32	.81	.79

Min., Max. Minimum and maximum observed scale scores, *YARI* Young Adult Routines Inventory

which measures perceived change in health status over the last year. The measure was designed to be self-administered by individuals aged 14 and older and has adequate to excellent reliability (Hays et al., 1995; McHorney et al., 1994). The *Emotional Well-Being* scale was utilized for the present study, which consists of five items that measure symptoms associated with depression and anxiety ($M = 70.38$, $SD = 21.97$, $\alpha = .90$; Hays et al., 1993). Reliability estimates for the current study were good ($\alpha = .81$).

Adult ADHD Self-report Scale (ASRS; Kessler et al., 2005)

The ASRS was used to screen ADHD-related symptoms. This 18-item diagnostic checklist of current symptoms is based on DSM-IV-TR ADHD criteria and has two underlying subscales. Nine items assess inattention, and nine items measure hyperactivity/impulsivity. The symptom frequency is rated on a five-point scale from 0 (*Never)* to 4 (*Very Often*). The questionnaire takes approximately five minutes to complete, and answers can be categorized dichotomously with a cut-off score of nine out of eighteen items, or scored as a continuous variable (Taylor et al., 2011). The internal consistency for the ASRS is between .75 and .89, and the sensitivity and specificity are 56% and 98%, respectively, with a total classification accuracy of 96% (Adler et al., 2006; Kessler et al., 2005; Taylor et al., 2011). Reliability for the current sample was similar to that of previous studies ($\alpha = .88$).

Procedure

Data collection was the same as Phase II.

Statistical Analyses

Data were analyzed using R software, including the *Psych* package (Revelle, 2017). Pearson correlations were conducted to test construct validity of the YARI with existing measures of time management, satisfaction with life,

emotional well-being, and ADHD symptoms. Further, t-tests were utilized to test convergent validity of the YARI to determine if the measure successfully differentiated individuals with self-reported ADHD and those without ADHD.

Results

To test the hypotheses about the convergent and construct validity of the YARI, Pearson correlations were conducted. Less than 2% of the variables were missing data. To prevent additional data loss, the sample mean for the variable was imputed in each of these few cases. Then, correlations were conducted between each subscale and composite scores of the YARI and the total score for the TSQ, SWLS, ASRS, and the *Emotional Well-being* scale of the RAND SF-36. The Pearson correlation coefficients for these analyses are displayed in Table 3. A Bonferroni correction was used to account for multiple comparisons.

As predicted, there was a strong correlation between the overall YARI scores and the scores on the TSQ, $r(368) = 0.69$, $p < .001$. Further, there were moderate correlations between the TSQ and each of the scales of the YARI. As predicted, there also was a moderate positive correlation between the SWLS and YARI composite score, $r(368) = .49$, $p < .001$, as well as the subscales. Interestingly, aside from the total YARI composite score, the *Social Routines* scale score had the strongest correlation with the SWLS, $r(368) = 0.40$, $p < .001$. The *Emotional Well-being* scale of the RAND SF-36 was positively correlated with the YARI composite, $r(368) = 0.38$, $p < .001$, as predicted. ADHD symptoms as measured by the ASRS produced a moderate negative correlation with the YARI composite score, as predicted in the fifth hypothesis, $r(368) = -0.39$, $p < .001$, with an even stronger negative correlation with the *Procrastination* items on the YARI, $r(368) = -0.45$, $p < .001$.

In addition to correlational analyses, we were interested in whether the YARI would distinguish individuals with ADHD from those without, as other measures of routines did so in younger individuals (e.g., Harris et al., 2013). For

Table 3 Correlations between YARI and related measures

Measure/Scale name	Daily routines	Social routines	Time management	Procrastination	YARI Total score
TSQ	.51**	.37**	.42**	.58**	.69**
SWLS	.33**	.40**	.24**	.32**	.49**
ASRS	−.19**	−.14	−.30**	−.45**	−.39**
SF-36: Emotional Well Being	.18*	.31**	.22**	.30**	.38**

TSQ Time Structure Questionnaire, *SWLS* Satisfaction with Life Scale, *ASRS* Adult Attention-Deficit/Hyperactivity Disorder Self-Report Scale, *SF-36* RAND 36-item Health Survey 1.0, *YARI* Young Adult Routines Inventory

* $p < .05$ with a Bonferroni correction; ** $p < .03$ with a Bonferroni correction

this test, the ADHD group included participants who had self-reported a diagnosis of ADHD, which included participants who reported only a diagnosis of ADHD ($n = 25$) and those who reported a diagnosis of ADHD along with other disorders ($n = 16$) for total of 41 participants with ADHD. To confirm that a self-reported ADHD diagnosis was an appropriate criterion to use for delineating the groups, we verified that the ASRS scores measuring ADHD symptoms for the ADHD ($n = 41$) and non-ADHD ($n = 329$) groups were significantly different using a Welch's t-test. Welch's more robust version of the t-test is recommended for use, especially when sample sizes are unequal, as it calculates separate variances (Zimmerman, 2004). The results of the Welch's t-test showed that the ADHD group had significantly higher ASRS scores than the non-ADHD group (t (53.89) = 6.93, $p < .001$, $d = 1.04$, 95% CI [7.47, 13.55]). Following this confirmation, the YARI total scores for the ADHD group were compared to the YARI scores for the non-ADHD group using the same statistical test. The YARI scores for the ADHD group were significantly lower than those for the non-ADHD group (t (47.79) = -.2.25, $p = .03$, $d = 0.42$, 95% CI [-8.71, -0.48]), which is indicative of fewer routines overall. Thus, the YARI was able to differentiate adults with and without ADHD and showed a small to moderate practical significance evidenced by the effect size. The mean and standard deviation for each group for the ASRS as well as the scales and composite scores of the YARI are presented in Table 4.

Finally, additional analyses were conducted to examine the convergent validity of the individual scales of the YARI. Like the analyses above, Welch's t-tests were conducted to examine the differences for the ADHD and non-ADHD groups for each scale. The difference was nonsignificant between the two groups on the *Daily Routines* scale (t (47.33) = -1.23, $p = .23$, $d = 0.23$, 95% CI [-2.74, 0.66]), and on the *Social Routines* scale (t (49.61) = -0.60, $p = .55$,

$d = 0.10$, 95% CI [-2.18, 1.18]). However, the ADHD group had scores significantly lower than the non-ADHD group on *Time Management* (t (46.404) = -2.25, $p = .03$, $d = 0.45$, 95% CI [-2.92, -0.16]). Also, a significant difference was found on the *Procrastination* scales (t (49.683) = -2.34, $p = .02$, $d = 0.40$, 95% CI [-2.82, -0.21]) where individuals with ADHD endorsed more procrastination and fewer productive routines than individuals without ADHD. These results suggest that *Time Management* and *Procrastination* may be especially important factors and areas of difficulty for individuals with ADHD in the sample, evidenced by the effect sizes which indicate small to moderate practical significance.

General Discussion

The purpose of the current study was to develop a measure of routines and time management practices in young adults. Routines and time management strategies are considered beneficial because they provide stability, structure, and a sense of control and are associated with numerous mental and physical health benefits. Lack of routines are associated with numerous physical and psychological health outcomes (e.g., substance use, ADHD, obesity). Although there are measures of routines in children, families, adolescents, and older adults, there was a paucity of measures for young adults.

Initial factor analyses suggested that the most promising factor solutions were the 3- and 4-factor solutions. Ultimately, the 4-factor, 25-item solution was chosen as it was the most theoretically cogent. The factors were, *Daily Routines*, related to daily tasks such as sleeping, eating, and scheduling, *Social Routines*, that included communication and participation in social or community activities. *Time Management* with items relating to planning and timeliness and *Procrastination* consisted of items related to interfering activities, as well as productive activities primarily in the home context.

Three of the four subscales of the YARI demonstrated adequate internal consistency, while the *Procrastination* scale exhibited questionable internal consistency. The overall YARI composite demonstrated good internal consistency. All scales had moderate intercorrelations with one another, except for *Procrastination* and *Social Routines* which showed a weak correlation, although a weak relationship between these two constructs is theoretically foreseeable. All four factors had strong correlations with the overall YARI composite, making it the best overall assessment of routines and time management, while each of the scales provide unique information which may be important to areas of particular interest or intervention within related areas of routines and time management.

Table 4 Descriptive statistics of ADHD and Non-ADHD groups

| | ADHD ($n = 41$) | | Non-ADHD ($n = 329$) | | |
	M	*SD*	*M*	*SD*	Welch's t-test
ASRS	38.86	9.01	28.35	10.29	6.93**
Daily Routines	18.39	5.19	19.43	4.37	−1.23
Social Routines	25.78	5.07	26.28	4.86	−0.60
Time Management	19.56	4.23	21.10	3.33	−2.25**
Procrastination	16.39	3.94	17.90	3.79	−2.34**
YARI Total	80.12	12.52	84.72	10.85	−2.25**

ASRS = ** $p < .03$, with a Bonferroni correction. Adult Attention-Deficit/Hyperactivity Disorder Self-Report Scale

YARI Young Adults Routines Inventory

To establish construct and convergent validity, the YARI was compared to the TSQ which is an established measure of time structure, closely related to routines and time management. As hypothesized, the YARI showed a strong positive association with time structure (i.e., TSQ). Similarly, all subscales of the YARI were moderately correlated with the total scores on the TSQ. Results provided initial evidence of construct validity of the YARI.

Research has shown that establishing and adhering to routines is associated with greater life satisfaction and sense of well-being; in contrast, a lack of routines is associated with an array of negative mental and physical health outcomes (Margraf et al., 2016). For example, as hypothesized the YARI was correlated positively with measures of well-being (i.e., RAND SF-36) and life satisfaction (i.e., SWLS). These relationships suggest that with increased routines and time management, individuals report higher levels of life satisfaction, lower levels of depression/anxiety.

One of the more common disorders where impaired routines and time management are often observed is ADHD. Previous measures of routines have been able to distinguish children and adolescents with ADHD from those without ADHD (Sytsma et al., 2001). As such, we aimed to explore the utility of the YARI in differentiating adults with and without self-reported ADHD. As hypothesized the YARI correlated negatively with higher levels of endorsed ADHD symptoms, suggesting that participants who reported more symptoms of ADHD also reported less frequent or consistent routines and time management practices. The YARI total score also differentiated a sample of adults with self-reported diagnoses of ADHD from individuals without the diagnosis. This finding provides initial support for the YARI's value in differentiating individuals with and without ADHD and aligns with previous findings for measures of routines in younger populations (Sytsma et al., 2001).

Additional analyses were conducted to explore whether the individual YARI subscales distinguished ADHD and non-ADHD participants as well. The results indicated that there was a statistically significant relationship between the YARI and the *Time Management* and *Procrastination* scales. However, the *Daily Routines* and *Social Routines* scales were not significantly different across the two groups. The findings suggest that the Time Management and *Procrastination* scales may be better measures of behaviors that are impacted by ADHD symptoms. Overall, the convergent validity of the YARI was supported in the analyses comparing the items of the new measure to existing assessments as well as through comparing subgroups of participants.

Taken together, the results of this study provide preliminary evidence that the YARI is a practical, theoretically supported, and valid measure of multidimensional routines and time management in younger adults. It was developed using a sample of adults aged 18–35, with characteristics ranging from high school graduate to post-graduate degree recipient, unemployed to fully employed, and single to married. Overall, the YARI appears to be an adequate instrument for use in its intended population. The YARI items and scale scores may be useful in identifying target behaviors when working with adults with ADHD or other individuals who lack adequate routines and purposeful behavior. Further, the instrument could be used to monitor progress in individuals who are working to improve their routines and time management. Thus, the measure has considerable practical applications.

Limitations and Future Directions

Despite the strengths of the results, the current study has several limitations. One chief concern was the biased nature of the sample. Although this study captured a variety of ages and lifestyles (e.g., related to employment, relationship status, and education), the participants in this study were predominantly White and female. Student participants from the university's psychology participant pool were expected to be mostly female, given the typical demographics of the major. Therefore, the current sample's homogeneity may have affected the frequency and variability of items endorsed and may not be as representative of males or non-White individuals. Future studies aiming to refine the development of the YARI should seek to obtain reliability and validity data using a more heterogeneous sample regarding race, ethnicity, and gender. Similarly, the sample size was too small to explore additional psychometric inquiries of interest, such as testing measurement invariance using formal multigroup analyses or examining developmental differences in older and younger samples. Recruiting a larger, highly diverse sample, would allow for examination of item invariance with regard to various participant characteristics (e.g., gender, age, income, education-level, etc.) an important and necessary next step in understanding the utility of the YARI.

Online survey attrition and careless responding are known risks to online survey data and thus, can introduce respondent bias (Huang et al., 2012; Ward et al., 2017). We attempted to address this problem by offering incentives for completion, and by removing participants who did not pass included attention checks. As a result, the number of participants who provided useable data was considerably fewer than the number of participants who began the study. Future studies employing the YARI may address this shortcoming by using different recruitment techniques (e.g., in person, or using online survey companies which assure quality responses).

Another limitation of the current study involves the psychometrics of the YARI factors. The fourth factor derived from the data, *Procrastination,* exhibited questionable internal consistency. This factor was ultimately included because

it approached acceptable internal consistency, and because the current study goal was to develop the YARI rather than validate its structure. Thus, it was retained for future studies which should work towards confirming the factor structure. Furthermore, the YARI scales together accounted for a limited amount of the variance in the population (i.e., 34.2%). Despite this, findings are similar to previous measures in the initial development phase. For example, the Adolescent Routines Questionnaire (ARQ; Piscitello et al., 2019) found 35.32% and 42.10% of the variance was accounted for by the parent-report and adolescent self-report versions of the ARQ respectively. Additional validation studies are needed to improve the psychometric properties of the YARI. For example, while the 4-factor solution was chosen because it performed slightly better with the current data, the 3-factor solution was similar in many ways. Thus, it may be beneficial to include items other than the 25 remaining items to consider both a three and four factor solution. This may help to address limitations in proportion of variance explained and internal consistency in future participant samples.

The YARI was successful in distinguishing those with ADHD from those without ADHD; however, the subsample of participants with self-reported ADHD was small and the diagnosis was not formally verified. Future studies should gather a more clinical and rigorously diagnosed sample with the goal of establishing interpretation guidelines and cutoff scores for the YARI. Nevertheless, the YARI in its current form can provide clinical utility informally through the identification of different areas of routine which may be compromised in individuals with ADHD or other disorders. The YARI may be used by practitioners to identify and target maladaptive or absent routines to use in progress monitoring measure.

Overall, many of these limitations can and should be addressed in future studies to refine and validate the factor structure of the YARI. The age range of this population is difficult to assess in the area of routines due to the diversity of lifestyles at this developmental stage. However, despite the aforementioned limitations of this study, the YARI appears to provide otherwise unmeasured information related to routines and time management practices in younger adults.

Conclusions

In summary, results of the study provide initial support for the YARI as a sound measurement tool with good internal consistency, and construct and convergent validity. The YARI adds to the literature, a useful tool for researchers and clinicians to examine functional impairment related to routines and time management, which is common among many mental health concerns. For example, this measure can be utilized when conducting initial assessment or impairment of routines and for progress monitoring in treatment

contexts. In its current state, the YARI represents a sorely needed update in measures assessing routines and related behaviors in young adults, a population neglected by similar measures in the past.

Data Availability The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Declarations

Ethics Approval Approval was obtained from the ethics committee of Louisiana State University. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest Morgan Grinnell, Jennifer Piscitello and Mary Lou Kelley have no relevant financial or non-financial interests to disclose.

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