

# Reliability of the Five Factor Wellness Inventory Among Male Adolescents

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## Abstract

Measuring adolescent wellness can assist researchers and practitioners in determining lifestyle behaviors in which adolescents are deficient. An appropriate objective assessment may assist male adolescents who feel uncomfortable revealing behaviors that may indicate wellness deficits. The authors examined the test-retest reliability of the Five Factor Wellness Inventory (5F-Wel) with a sample of male adolescents. Thirty-five participants self-completed the 5F-Wel on two separate occasions, 7 days apart. Limits of agreement, intraclass correlation coefficients, and paired *t* tests were calculated to investigate agreement and whether systematic differences existed between administrations. The initial findings indicate the 5F-Wel is reliable for use among male adolescents and support its use in research.

*Keywords:* adolescent, instrument, male, measurement, reliability, wellness

Unhealthy lifestyle behaviors established during adolescence may carry on into adulthood (Hallal, Victora, Azevedo, & Wells, 2006; Kemper, de Vente, van Mechelen, & Twisk, 2001; Trudeau, Laurencelle, & Shephard, 2004) and can lead to disability and disease later in life (Guo & Chumlea, 1999; Wright, Parker, Lamont, & Craft, 2001). Given the importance of establishing positive lifestyle behaviors during adolescence, interventions to improve these behaviors during this critical stage of life are worthy of investigation. To this end, measuring adolescent wellness can assist researchers and practitioners in determining lifestyle behaviors in which adolescents are deficient. Behavior change interventions can then be designed that directly aid in the promotion of these areas.

The complexity of male psychology and social constructions of masculinity make it challenging to deliver effective and consistent care to male adolescents (Bell & Ginsburg, 2003). An appropriate objective assessment may provide a useful starting point for male adolescents who feel uncomfortable discussing behaviors indicative of wellness deficits (Westwood & Pinzon, 2008). Male adolescents are less likely to seek health care than their female counterparts (Westwood & Pinzon, 2008). This is particularly true for emotional or mental health-related problems, as young men may

consider this to be perceived as weakness (Westwood & Pinzon, 2008). Clinical visits from male adolescents are often brief and usually due to an acute illness, injury, or a physical complaint (Westwood & Pinzon, 2008). Male adolescents are more likely to binge-drink alcohol, to drive a vehicle while intoxicated (Elster & Marcell, 2003), to carry a weapon, to become involved (and injured) in a physical fight, and to use marijuana (Eaton et al., 2012). To prevent sustained engagement in risk-taking behaviors, it may be beneficial for health care professionals to identify male adolescents engaging in these types of behaviors early in order to intervene (DuRant, Smith, Kreiter, & Krowchuk, 1999).

The concept of wellness is an important phenomenon that offers a point of difference to other health-related concepts. For example, health has traditionally been conceptualized and evaluated from an illness perspective. When a person is deemed to have good health, it conventionally means that the person is not suffering from any identifiable disease (Breslow, 1972). Furthermore, an improvement in that person's health is traditionally understood to mean that a disease is less severe. Alternatively, wellness has been described as a dynamic process maximizing an individual's potential (Dunn, 1977) and as an active process through which the individual becomes aware of and makes choices toward a more successful existence (Hettler, 1980). Wellness can be conceptualized as a multidimensional, holistic notion, focusing on the individual's journey to being the best that he or she can be, within his or her environment. Following this early work, numerous theories and models have been created to represent wellness, all of which encompass a diverse range of lifestyle dimensions. One such model of wellness that has been developed, largely based on the Individual Psychology of Alfred Adler, is the Wheel of Wellness (WoW; Sweeney & Witmer, 1991), later revised as the Indivisible Self Model of Wellness (IS-Wel). Wellness assessment instruments derived from these theories allow researchers and practitioners to apply these concepts in a variety of contexts and settings.

The Five Factor Wellness Inventory (5F-Wel) is a popular instrument for measuring the broad aspects of wellness among adolescents (Myers, Willse, & Villalba, 2011; Tatar & Myers, 2010). In combination with its predecessor, the Wellness Evaluation of Lifestyle (Myers, Sweeney, & Witmer, 2004), it has been a wellness instrument extensively used among adolescents (Chang & Myers, 2003; Garrett, 1999; Garrett, Rivera, Dixon, & Myers, 2009; Myers & Bechtel, 2004; Rayle, 2005; Rayle & Myers, 2004; Smith-Adcock, Webster, Leonard, & Walker, 2008). The 5F-Wel instrument is designed to measure the IS-Wel. This is an empirically based model, developed from a factor analysis of Wellness Evaluation of Lifestyle data (Myers & Sweeney, 2004). The IS-Wel is grounded in Adlerian counseling theory (Adler, 1927/1954) that emphasizes the indivisibility of the self. This is what Adler defined as holism and is based on a single, higher order wellness factor that includes



Figure 1. The Indivisible Self: An Evidence-Based Model of Wellness (Myers & Sweeney, 2004). Reprinted by permission.

all wellness components (Myers et al., 2011; see Figure 1). The 5F-Wel was developed to assess the factors included in the IS-Wel. These factors include elements relevant to assessments of male adolescents, including IS-Wel subscales reflective of risk-taking behavior.

Although the 5F-Wel has been used among adolescents, no empirical investigation of test-retest reliability in this population has been published. Prior studies involving the 5F-Wel have reported factor analysis for the 5 second-order factors (dimensions of self; Hattie, Myers, & Sweeney, 2004), and internal consistency (Myers & Sweeney, 2005) of the instrument within adult populations. It is important that reliability of the 5F-Wel is established with adolescents to support its use in observing wellness in a cohort at a single time point, change over time, or the effect of positive behavior-based interventions on wellness. The aim of this investigation was to examine the test-retest reliability of the 5F-Wel instrument when self-completed by male adolescents.

## Methods

**Design.** Participants completed the 5F-Wel on two separate occasions (test-retest), with seven days between assessments.

**Participants and setting.** This investigation included 35 young adolescents aged between 12 and 14 years. Participants were from an all-male secondary school in a metropolitan area of Brisbane, Australia.



**Instrument.** The 5F-Wel T version (the 5F-Wel modified to a sixth grade reading level) is a 97-item questionnaire that includes attitudinal and behavioral statements (e.g., "I eat a healthy diet"), with which respondents rate their agreement using a four-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*; Myers et al., 2011). The instrument takes approximately 15 min to complete. The questions are grouped to contribute to 17 subscales, four context scores, and an overall life satisfaction index (Myers et al., 2011). Mean item ratings for each subscale are computed and modified using a linear transformation to make the scales comparable, with each having a range from 25–100 (Myers et al., 2011). The 17 subscales can be grouped into five dimensions that comprise total wellness (creative, coping, social, essential, and physical). Subscales are listed under their respective dimensions in Table 1, and an illustration of the relationship between subscales, dimensions, and overall wellness are presented in Figure 1. Detailed definitions of dimensions and subscales and information on theory development have previously been described (Myers & Sweeney, 2004).

**Procedure.** Participants completed their initial 5F-Wel report in the morning during class time, at their school. Participants then completed the 5F-Wel in the same scheduled class seven days later. The questionnaire was distributed by the same researcher who attended both assessments. A seven-day period was chosen so that participants would have a lower chance of recalling their responses from the previous administration while also minimizing the chance of substantial life changes between assessments (McPhail et al., 2009). This study was approved by the Human Research Ethics Committee of the Queensland University of Technology.

**Data analysis.** Data analysis was completed using the Statistical Package for the Social Sciences (SPSS). Limits of agreement and intraclass correlation coefficients with 95% confidence intervals (CI) were calculated to investigate agreement between the two assessments for each of the 17 subscale scores, five dimension scores, four context scores, life satisfaction index, and total wellness score of the 5F-Wel. Limits of agreement represent a reference interval (also known as a "normal range") for the test-retest differences expected for 95% of individuals in a population. These reference intervals are used to make probability statements for expected values using the known relationship between the standard deviation and centiles of a normally distributed population (Atkinson & Nevill, 2000). Intraclass correlation coefficient is a measure of agreement expressed as a coefficient between 0 and 1, where a higher value represents stronger concordance. Although criterial levels for intraclass correlation coefficients have been described as "hopelessly arbitrary" (de Mast, 2007), values less than 0.40 are commonly described as "poor to fair," from 0.40 to 0.75 as "fair to good," and greater than 0.75 as "excellent" (Fleiss, 1986).

**Table 1**  
 Intraclass Correlation Coefficients (ICC), Mean Scores, and Limits of Agreement (LOA) for the  
 Dimensions and Total Wellness Score of the 5F-Wel

Measure	Limits of agreement						p
	ICC (95% CI)	Mean 1 (SD)	Mean 2 (SD)	Lower LOA (95% CI)	Mean difference (95% CI)	Upper LOA (95% CI)	
Thinking	0.86 (0.74, 0.93)	79.7 (13.3)	82.2 (13.1)	-16.69 (-18.39, -14.99)	-2.5 (-4.20, -0.80)	11.69 (9.99, 13.39)	0.045
Emotions	0.54 (0.25, 0.74)	85.1 (10.1)	84.8 (10.1)	-19.39 (-21.75, -17.03)	0.38 (-1.99, 2.74)	20.14 (17.78, 22.51)	0.823
Control	0.80 (0.63, 0.90)	79.8 (13.1)	82.9 (12.5)	-19.73 (-21.71, -17.74)	-3.12 (-5.11, -1.14)	13.48 (11.50, 15.47)	0.033
Work	0.82 (0.67, 0.91)	82.1 (11.4)	82.1 (11)	-13.63 (-15.26, -12.01)	0 (-1.63, 1.63)	13.63 (12.01, 15.26)	1.000
Humor	0.65 (0.40, 0.81)	83.3 (11)	85.5 (10.7)	-20.64 (-22.84, -18.43)	-2.21 (-4.41, -0.00)	16.22 (14.022, 18.43)	0.166
<b>Creative Self</b>	0.90 (0.81, 0.95)	81.9 (9.8)	83.3 (9.6)	-10.20 (-11.25, -9.14)	-1.41 (-2.46, -0.36)	7.38 (6.33, 8.43)	0.066
Leisure	0.48 (0.18, 0.70)	85.9 (8.3)	86.3 (9.1)	-18.44 (-20.60, -16.28)	-0.37 (-2.53, 1.80)	17.71 (15.55, 19.87)	0.811
Stress Management	0.86 (0.73, 0.93)	80.0 (12.2)	82.4 (12.8)	-16.02 (-17.65, -14.39)	-2.39 (-4.02, -0.76)	11.24 (9.61, 12.87)	0.046
Self Worth	0.78 (0.61, 0.89)	88.1 (9.2)	89.9 (10.9)	-15.26 (-16.86, -13.65)	-1.83 (-3.4, -0.23)	11.60 (9.99, 13.20)	0.116
Realistic Beliefs	0.80 (0.64, 0.90)	56.0 (11.3)	54.4 (10.6)	-12.46 (-14.14, -10.77)	1.62 (-0.06, 3.30)	15.69 (14.01, 17.37)	0.183

<b>Coping Self</b>	0.75 (0.56, 0.87)	78.3 (5)	79.1 (6.3)	-8.934 (-9.90, -7.96)	-0.82 (-1.79, 0.15)	7.29 (6.32, 8.26)	0.241
Friendship	0.66 (0.42, 0.82)	86.6 (9.3)	87.8 (10.2)	-17.38 (-19.32, -15.44)	-1.18 (-3.11, 0.76)	15.03 (13.09, 16.97)	0.396
Love	0.75 (0.55, 0.87)	88.6 (10.3)	89.7 (12)	-17.13 (-19.05, -15.22)	-1.1 (-3.02, 0.82)	14.93 (13.02, 16.85)	0.423
<b>Social Self</b>	0.73 (0.53, 0.86)	87.7 (9.1)	88.8 (10.5)	-15.79 (-17.54, -14.04)	-1.13 (-2.88, 0.63)	13.54 (11.78, 15.29)	0.370
Spirituality	0.93 (0.87, 0.97)	49.9 (23.4)	51.5 (23.6)	-19.24 (-21.34, -17.13)	-1.62 (-3.72, 0.49)	16.00 (13.90, 18.11)	0.285
Gender Identity	0.58 (0.30, 0.76)	88.4 (9.2)	90.5 (9.3)	-19.34 (-21.41, -17.27)	-2.02 (-4.09, 0.05)	15.29 (13.23, 17.36)	0.176
Cultural Identity	0.75 (0.56, 0.87)	82.7 (12.7)	83.1 (12.1)	-18.012 (-20.12, -15.90)	-0.37 (-2.48, 1.74)	17.28 (15.17, 19.39)	0.807
Self Care	0.62 (0.35, 0.79)	94.7 (5.8)	92.9 (7.8)	-10.45 (-11.91, -8.99)	1.77 (0.31, 3.22)	13.98 (12.52, 15.44)	0.097
<b>Essential Self</b>	0.91 (0.82, 0.95)	78.2 (8.4)	78.7 (9.5)	-8.43 (-9.38, -7.48)	-0.48 (-1.43, 0.48)	7.47 (6.52, 8.42)	0.483
Exercise	0.75 (0.55, 0.87)	84.4 (12.8)	87.2 (11.2)	-20.14 (-22.21, -18.07)	-2.79 (-4.87, -0.72)	14.55 (-4.87, -0.72)	0.065
Nutrition	0.78 (0.61, 0.89)	87.9 (11.2)	89.0 (11.4)	-16.21 (-18.01, -14.40)	-1.09 (-2.90, 0.71)	14.02 (12.21, 15.83)	0.398
<b>Physical Self</b>	0.75 (0.55, 0.86)	85.0 (9.9)	87.1 (9.6)	-16.23 (-17.92, -14.54)	-2.11 (-3.80, -0.42)	12.01 (10.32, 13.69)	0.086
<b>Total Wellness</b>	0.88 (0.78, 0.94)	81.8 (6.5)	82.9 (7.3)	-7.75 (-8.56, -6.94)	-1.01 (-1.81, -0.20)	5.731 (4.926, 6.54)	0.086

Note. Mean 2 data collected seven days after Mean 1 data collection. CI = confidence interval.



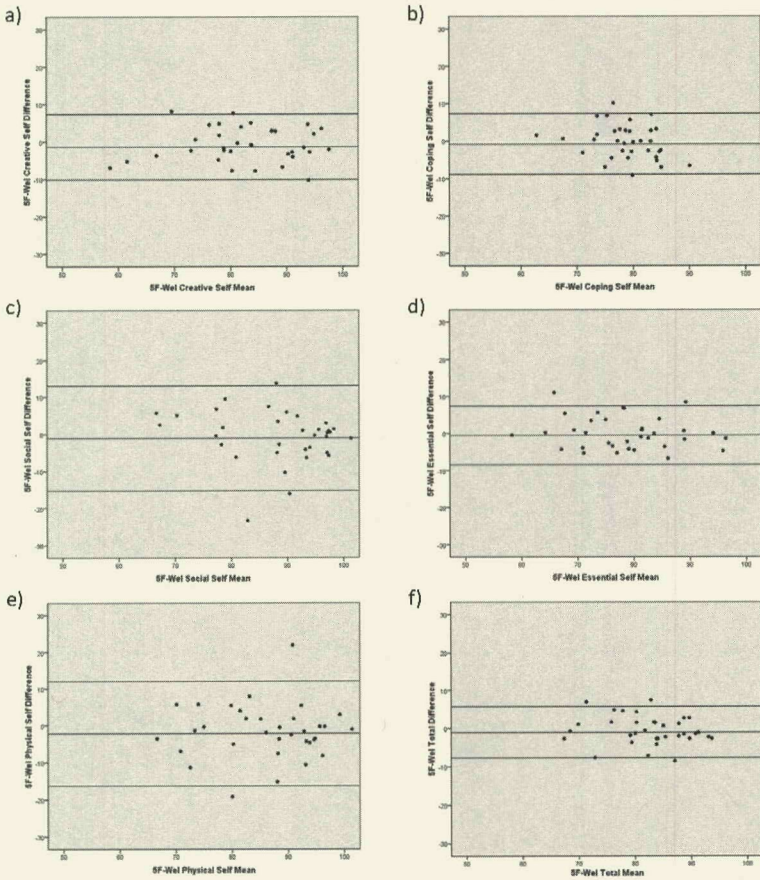


Figure 2. Bland–Altman plots for 5F-Wel dimensions, including (a) Creative Self, (b) Coping Self, (c) Social Self, (d) Essential Self, and (e) Physical Self, as well as (f) the Total Wellness score.

Paired *t* tests were employed to examine whether systematic differences between the two administrations existed for each subscale score. Bonferroni corrections for multiple comparisons were used to adjust *t*-test alpha to .002 to mitigate the chance of Type-I error (Cabin & Mitchell, 2000). Therefore, *p*-values less than .002 (rather than .05) would indicate that a systematic difference exists. Although the adjusted Type-I error rate is employed, three scales would have statistically significant differences with  $\alpha = .05$ . Bland–Altman plots (Bland & Altman, 1986) were also completed for total wellness and the five dimensions of wellness (Figure 2) to analyze the agreement between the two assessments. This plot of difference against the mean allows

the investigation of any possible relationship between the measurement error and the true value (Bland & Altman, 1986).

## **Results**

A total of 34 (97%) participants completed the 5F-Wel questionnaire at both assessments and were included in the analysis. One participant was absent from school for the second assessment and was excluded from all analyses. The mean age of participants was 13.6 ( $SD = 0.6$ ) years. The mean scores for each of the 17 subscales, five dimensions, and for total wellness at each 5F-Wel assessment are presented in Table 1. There were no significant differences between assessments for subscale, dimension, or total wellness scores ( $p$ -value range 0.033 to 1.000). The mean score for the five contexts and life satisfaction index for the 5F-Wel are presented in Table 2. There were no significant differences for the four context scores and life satisfaction index ( $p$ -values range 0.284 to 0.711). This indicates no systematic differences between assessments were present.

Agreement statistics for each of the 17 subscales, five dimensions, and total wellness at each 5F-Wel assessment are presented in Table 1. Intraclass correlation coefficients for the 17 subscales ranged from 0.48 (Leisure) to 0.93 (Spirituality). Intraclass correlation coefficients for the five dimension scores ranged from 0.73 (Social Self) to 0.91 (Essential Self). The limits of agreement were similar across subscales, dimensions, and total score and were consistently centered around 0 with a range  $\pm 6.7$ – $19.7$  points (Table 1). Bland–Altman plots are presented for dimension scores and the total wellness score (Figure 2). There was only a small amount of variation in the limits of agreement and Bland–Altman plots across domains with no overall pattern of disagreement across domains evident.

Agreement statistics for each of the four context scores and life satisfaction index at each 5F-Wel assessment are presented in Table 2. Intraclass correlation coefficients for the four context scores ranged from 0.73 (Global Context) to 0.85 (Local Context). The limits of agreement were similar across contexts and the life satisfaction index and were consistently centered on 0 with a range  $\pm 11$ – $28.2$  points (Table 2).

## **Discussion**

The 5F-Wel generally had fair-to-excellent levels of agreement between assessments. The intraclass correlation coefficients, mean difference, paired  $t$  tests, and limits of agreement (Table 1 and Table 2) between assessments suggested there was only a small amount of random error, indicating that



**Table 2**  
 Intraclass Correlation Coefficients (ICC), Mean Scores, and Limits of Agreement (LOA) for the  
 Context Scores and Life Satisfaction Index of the 5-F Wel

Measure	ICC (95% CI)	Mean 1 (SD)	Mean 2 (SD)	Limits of agreement				p
				Lower LOA (95% CI)	Mean difference (95% CI)	Upper LOA (95% CI)		
Local Context	0.85 (0.71, 0.92)	91.8 (9.2)	91.3 (10.2)	-10.56 (-11.87, -9.24)	0.44 (-0.87, 1.76)	11.44 (10.12, 12.75)	0.638	
Institutional Context	0.75 (0.55, 0.87)	71.9 (12)	73.6 (12.9)	-19.69 (-21.85, -17.54)	-1.66 (-3.81, 0.50)	16.37 (14.22, 18.53)	0.284	
Global Context	0.73 (0.53, 0.86)	79.1 (9.2)	79.9 (14.2)	-19.67 (-23.04, -16.30)	8.54 (5.17, 11.91)	36.74 (33.37, 40.12)	0.683	
Chronometrical Context	0.74 (0.54, 0.86)	86.8 (12.3)	87.3 (10.7)	-17.48 (-19.51, -15.46)	-0.55 (-2.58, 1.47)	16.38 (14.35, 18.40)	0.702	
Life Satisfaction Index	0.68 (0.45, 0.83)	90.4 (13.8)	91.2 (14.9)	-24.06 (-26.85, -21.27)	-0.74 (-3.52, 2.05)	22.59 (19.80, 25.38)	0.711	

Note. Mean 2 data collected seven days after Mean 1 data collection. CI = confidence interval.

any disagreement was small in magnitude and not systematic (i.e., not consistently higher or lower at either assessment). This is congruent with what one might expect from a reliable wellness instrument when assessments were carried out one week apart. This study is the first investigation of reliability for the 5F-Wel instrument among male adolescents and suggests that the instrument is reliable with this population.

There was no overarching pattern of disagreement across the scores on the 17 subscales, five dimensions, total wellness score, four contexts, and overall life satisfaction index. The subscale with the closest agreement between assessments was Spirituality (intraclass correlation coefficient of 0.93). Most questions that contribute to the Spirituality subscale involve attending church or undertaking religious activities. The high level of agreement for this subscale is not surprising given that participants in this sample are unlikely to change religious beliefs or spiritual practices between the two assessments. The subscale with the lowest intraclass correlation coefficient (0.48) was Leisure. However, there was still moderate agreement in this subscale between the two assessments (Fleiss, 1986). Given that leisure activities in this sample may well change somewhat from week to week among participants, this level of agreement could be an underestimation of the true reliability of this subscale.

Reliable measures of wellness are important for observing the effect of interventions on wellness, to observe wellness in a sample cohort at a single time point or changes that may occur over time. This study has provided foundational empirical evidence that supports the reliability of this instrument with male adolescents. This evidence is important to inform multidimensional wellness instrument selection for observational studies and intervention evaluation targeted at male adolescents. Findings from this research support the use of the 5F-Wel for this purpose. Using the 5F-Wel with this population enables researchers and practitioners to assess wellness and provide guidance in a population that is less likely to seek assistance independently (Westwood & Pinzon, 2008). Comparisons of findings from this study to prior research are difficult given the scarcity of empirical work in this field. There have been no prior investigations of test-retest reliability of the 5F-Wel among adolescents. However, the level of reliability reported in this investigation compares favorably with intraclass correlation coefficients reported for other self-reported instruments among male adolescents, such as the International Physical Activity Questionnaire (0.11 to 0.77) and the World Health Organization's Health Behavior in School-Aged Children survey (0.59 to 0.66; Rangul, Holmen, Kurtze, Cuyppers, & Midthjell, 2008). Additionally, the level of reliability observed in this investigation is also comparable to that observed when wellness instruments have been evaluated among adult populations (Brown, Geiselman, Copeland, Gordon, & Richard-Eaglin, 2008; Myers, Sweeney, & Luecht, 2004).

A study of this nature has two potential limitations (McPhail et al., 2009). Firstly, there is the innate risk that a participant may have anticipated the purpose of the study, recalled their original answers, and responded in the same way when completing the questionnaire for the second time. The second is the risk that a participant's life situation or attitudes to the assessment statements may have measurably changed between the two assessment points. We believe that this study was more at risk of the second limitation than the first because we allowed a seven-day period between assessments. This, combined with the number of items (97) that a respondent would have had to remember correctly, gave some protection against the memory-recall limitation. Given the nature of our design, we argue that the results of this investigation provide evidence to support the use of the 5F-Wel among adolescents. This may comprise a number of settings, including research environments, schools, or community centers, and with practitioners, such as school-based nurses, counselors, and social workers.

There are also several factors that may limit the extrapolation and transferability of findings from this study. The sample included male participants; female adolescents may or may not have responded in the same way as the male adolescents in this investigation. Similarly, data collection was undertaken in a nondenominational private school in a developed nation where adolescents are likely to have a high level of literacy. It is unlikely that socioeconomically or educationally disadvantaged adolescents were represented in this sample and may not have responded in the same way as participants in this study.

While this investigation provides important foundational empirical evidence for use of the 5F-Wel instrument, there are several related research priorities. In addition to investigating the reliability of the 5F-Wel among female adolescents and among socioeconomically or educationally disadvantaged adolescents, the reliability of the instrument across possible alternative modes of administration should also be a priority for future research. In this study the 5F-Wel was administered as a paper-based questionnaire. Two alternative modes of administration worthy of investigation among adolescents include computer administration (such as via a web-based survey platform) and telephone administration. These two alternative modes of administration, if reliable, may facilitate 5F-Wel completion in professional and research contexts. Web-based administration may increase the feasibility of large-scale investigations and offer a convenient alternative for computer-savvy adolescents. Telephone administration may improve response rates for investigations where participants have not completed and returned the paper-based version. However, for telephone reliability to be established, it may be prudent to first investigate whether the 5F-Wel questions elicit the same responses when self-completed versus



interviewer-administered. It is foreseeable that an adolescent may not provide the same responses to an interviewer than when self-completing the instrument in relative privacy. Any discrepancy observed between interviewer administration and self-completion of the instrument may also influence an inter-mode reliability study investigating telephone administration of the 5F-Wel.

This study has been the first to investigate the reliability of the 5F-Wel instrument among male adolescents. Overall, there was fair-to-excellent agreement across the first and second administrations of the instrument. These findings suggest the 5F-Wel instrument is reliable for use with male adolescents and supports its use in research.

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