**Financially focused self-concept:
Measurement invariance, stability, and concurrent validity**

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Abstract

People with a financially focused self-concept overvalue the importance of financial success for self-definition and self-worth. Herein, we examined whether the measurement properties of the financially focused self-concept scale (FFS) are invariant over time and across different demographic groups of people who gamble. We also assessed the temporal stability and concurrent validity of the FFS. In Study 1 ($N=147$), community players completed the 4-item FFS and problem gambling severity index (PGSI) on two assessments about four weeks apart. In Study 2 ($N=135$), students who gamble completed the FFS and PGSI about 6-7 months apart. In Studies 1 and 2, FFS had strong temporal measurement invariance and moderate-to-high temporal stability. FFS and PGSI were also positively associated within and across assessments in Studies 1 and 2. Additionally, in Study 2, an increase in FFS over time was accompanied by an increase in PGSI. FFS also had partial measurement invariance across community and student players. Findings provide support for assumptions of longitudinal and comparative research designs. Findings are anchored in prior research on the effects of a focused self-concept in other domains. We also call for longitudinal and comparative gambling research on the antecedents and consequences of a financially focused self-concept.

Keywords: self-concept; disordered gambling; financial success; measurement invariance.

Financially focused self-concept:

Measurement invariance, stability, and concurrent validity

Some individuals overvalue the importance of their financial success for self-definition and self-worth (Tabri, Wohl, Eddy, & Thomas, 2017). A growing body of research indicates having a financially focused self-concept has predictive utility to identify players at risk of developing gambling problems (Tabri, Hollingshead, & Wohl, 2019; Tabri, Salmon, & Wohl, in press; Tabri, Shead, & Wohl, 2017; Tabri, Werner, Milyavkaya, & Wohl, 2018; Tabri, Wohl, et al., 2017; Tabri, Wohl, Wood, & Philander, 2018; Tabri, Wood, Philander, & Wohl, in press; Wood, Wohl, Tabri, & Philander, 2017). For example, among community players, Tabri, Wohl, et al. (2017) showed that greater financial focus was uniquely and moderately associated with disordered gambling severity above and beyond known risk factors for gambling, including personal income, Big-Five personality domains, global self-esteem, personal relative deprivation and materialism. Critically, however, this body of work used a cross-sectional research design, which limits the ability to draw causal inferences about the nature of the relation between financially focused self-concept and gambling outcomes.

In the current research, we tested whether the same financially focused self-concept construct can be measured over time and across different types of players. To this end, we conducted a longitudinal study of community members (Study 1) and university students (Study 2) who gamble that assessed financial focus at two time points and examined the measurement invariance of the financially focused self-concept construct over time and between different types of players.

Financial focus and disordered gambling

A defining aspect of some individuals' self-concept is their perceived financial success (Park, Ward, & Naragon-Gainey, 2017; Tabri, Wohl, et al., 2017). Such individuals are motivated to act in ways they believe will increase their wealth. This is because individuals generally seek means to bolster their self-worth in domains on which their self-worth is staked (Crocker & Knight, 2005; Crocker & Park, 2004). Accordingly, financially focused people often try to increase the amount of money they have through conventional avenues (e.g., hard work and saving; see Tabri, Wohl et al., 2017). However, people with a financial focus may also try to boost their wealth (and thus self-worth) through unconventional avenues such as gambling, especially if they believe conventional avenues to financial success are inaccessible (Tabri, Dupuis, Kim, & Wohl, 2015).

Unfortunately, gambling for financial gain is a well-established predictor of disordered gambling (e.g., Clarke et al., 2006; Hahn, Wilson, McRae, & Gilbert, 2013; Lister, Nower, & Wohl, 2016; MacLaren, Ellery, & Knoll, 2015; Tabri et al., 2015). Players who are high in financial focus are therefore at heightened risk for disordered gambling compared to players low in financial focus (Tabri et al., 2019; Tabri, Salmon, et al., in press; Tabri, Shead et al., 2017; Tabri, Werner et al., 2018; Tabri, Wohl, et al., 2017).

One reason for the link between a financially focused self-concept and disordered gambling symptomatology is that players high in financial focus are more likely to gamble irresponsibly (Tabri et al., 2019; Tabri, Wood, et al., in press; Wood et al., 2017). For instance, players high in financial focus score low on measures of responsible gambling beliefs (e.g. believing that gambling is not a good way to make money) and behaviors (e.g. setting a money limit on gambling expenditures), compared to players low in financial focus (Tabri, Wood, et al., in press; Wood et al., 2017). Electronic gaming machine players high in financial focus were

shown to spend more money on their gambling activities compared to players low in financial focus, despite receiving pop-up messages indicating that they were approaching their money limit (Tabri et al., 2019).

Another reason for the association between a financially focused self-concept and disordered gambling is because those who are more financially focused tend to have etiological risk factors of gambling disorder compared to those who are less financially focused (Tabri, Salmon et al., in press; Tabri, Werner et al., 2018; Tabri, Wohl et al., 2018). For example, among players without gambling problems, Tabri, Wohl et al. (2018) showed that having a financial focus was moderately and positively associated with etiological risk factors for disordered gambling, including erroneous gambling beliefs, financial dissatisfaction, low perceived self-efficacy to cope with life adversity, and impulsivity. These findings dovetail with recent research linking financial focus among disordered gamblers with etiological subtypes of disordered gambling specified in the Pathways Model (Blaszczynski & Nower, 2002; also see Nower & Blaszczynski, 2017). The Pathways Model describes three distinct subtypes of disordered gambling that are defined by unique vulnerabilities. *Behaviourally conditioned* players do not have any etiological risk factors (e.g. premorbid psychopathology) but develop gambling problems due to the reinforcement contingencies of gambling. *Emotionally vulnerable* players are vulnerable to stress and negative affect (e.g., mood disorders), and develop gambling problems because they gamble to escape these aversive states. *Anti-social impulsive* players have impulsivity and anti-social personality traits and develop gambling problems because they gamble to enhance positive affect. Tabri, Salmon, et al. (in press) showed that having a financial focus was greater among disordered players who were classified as emotionally vulnerable or anti-social impulsive compared to disordered players classified as behaviorally conditioned.

Although prior research suggests that financially focused self-concept may proliferate and maintain disordered gambling, the extant research relied solely on cross-sectional research designs. As such, it is difficult to draw causal inferences about the nature of the relation between financially focused self-concept and gambling outcomes. To help determine the nature of this relation, longitudinal (e.g., do financial focus and gambling problems reinforce each other over time?) and experimental (e.g., does manipulating beliefs about financial success affect gambling behavior?) research is needed.

To facilitate longitudinal research, antecedent psychometric research is required to confirm that the measurement of the financially focused self-concept is invariant over time. This is important because when measurement properties of a given scale are not temporally invariant, results from longitudinal data analyses may lead to ambiguous or misleading conclusions about change (Little, 2013; Lord, 1958; Newsom, 2015). Likewise, before proceeding with experimental or correlational research comparing different types of players, antecedent psychometric research is needed to confirm that the same financially focused self-concept construct is being measured among different types of players. This is important because when measurement properties of a given scale are not invariant across groups, results from comparative analyses may lead to ambiguous or misleading conclusions about differences between groups.

Overview of the current research

The current research had two aims. The first aim was to examine whether the measurement of the financially focused self-concept construct is invariant over time. The second aim was to examine the measurement invariance of the financially focused self-concept construct between different demographic groups of people who gamble. To accomplish the first aim, we

examined the longitudinal measurement invariance, stability, and concurrent validity of the financially focused self-concept construct in two studies involving different demographic groups of people who gamble.

In Study 1, we conducted an analysis of existing data from players who gamble with a Canadian provincial gaming provider. The data were collected as part of a large research project in which associations examined in the current research were not reported in the original study (see Wood et al., 2017; Study 3). Participants completed the 4-item financially focused self-concept scale (FFS; Tabri Wohl, et al., 2017) and the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) twice, approximately one month apart. To understand whether the financially focused self-concept construct is invariant over time, we examined the temporal measurement invariance of the 4-item FFS as well as the stability and change in the 4-item FFS over a one-month period. We also examined the concurrent validity of the 4-item FFS in relation to the PGSI over time, and whether an increase in FFS is accompanied by an increase in PGSI.

In Study 2, the goal was to replicate and extend Study 1 with a sample of people who gamble that are enrolled in university. They completed the FFS and PGSI measures on two assessments approximately 6-7 months apart. To date, no published research has examined financially focused self-concept among university students who gamble and doing so is important for external validity of the financially focused self-concept construct. In addition, examining financially focused self-concept among university students is important because recent research has shown that college and university students who view money as an important indicator of success, prestige, and power were more likely to gamble and to have severe gambling problems (e.g., Lostutter et al. 2019).

To accomplish the second aim, we examined whether the measurement invariance of the financially focused self-concept between different demographic groups of people who gamble. More specifically, we tested whether the FFS indicators at time 1 are invariant across participants in Study 1 (an older community sample of people who gamble) and participants in Study 2 (a younger student sample of people who gamble). We examined measurement invariance of the FFS indicators across both groups at time 1 only because we expected the FFS indicators at times 1 and 2 to be invariant within each group.

All research materials, statistical input and output files, and the analyzed data (for Study 2 only) reported herein can be accessed via the Open Science Framework (OSF):

https://osf.io/c49ft/?view_only=b1cca60c236944ab96a174b803490cbd

Study 1

Method

Participants, procedure, and materials. Participants were 147 (49 men and 51 women) community player who were customers of the British Columbia Lottery Corporation (see Study 3 in Wood et al., 2017). In terms of self-reported age, 43.5% of participants were +65 years old, 27.2% were in the 55-64 age band, 16.3% were in the 45-54 age band, 7.5% were in the 35-44 age band, 4.1% were in the 25-34 age band, and 1.4% were in the 19-24 age band. They completed the 4-item FFS twice about one month apart. The items were “How I feel about myself is largely based on the amount of money I have,” “My moods are influenced by the amount of money I have,” “People will think less of me if I don’t have a lot of money,” and “The opportunities that are available to me depend on the amount of money I have.” Responses were anchored at 0 (*not at all*) and 4 (*extremely*). The items at each time point were internally

consistent (time 1 $\alpha = 0.804$, time 2 $\alpha = 0.821$). An average at each time point was calculated with higher number reflecting greater financial focus.

To assess severity of disordered gambling, participants completed the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) at both assessments. The PGSI includes nine items that measure the extent of problem gambling behaviors (e.g., “Have you gone back another day to try and win back the money you lost?”) and the consequences of engaging in problem gambling behaviors (e.g., “Has your gambling caused any financial problems for you or your household?”). Participants responded by indicating how frequently they engaged in problem gambling behaviors and experienced consequences due to their gambling behavior. Responses were anchored at 0 (*never*) and 3 (*almost always*). At time 1, the PGSI assessed severity of disordered gambling over the last 12 months. At time 2, the PGSI assessed severity of disordered gambling over the last month. Items at each time point were internally consistent (time 1 $\alpha = 0.966$, time 2 $\alpha = 0.831$). Total scores were calculated at each time point with higher numbers reflecting greater disordered gambling severity.

Data analytic plan. The longitudinal measurement invariance of the 4-item FFS scale at times 1 and 2 was assessed using structural equation modelling (SEM; see Kline 2016). This involves conducting a series of sequential models that test the equality of different model parameters. In the first model, known as the configural invariance model, the factor configuration of the FFS is examined simultaneously across the two measurement occasions, which involves testing a confirmatory two-factor model of FFS (with four observed indicators) on two occasions. In the model, residual covariances between the same indicators across measurement occasions are included and no equality constraints are included on any model parameters across the two occasions. For model identification purposes, factor means were fixed

to zero and factor variances were fixed to one. A well-fitting configural model is necessary before testing the equality of model parameters across measurement occasions. The likelihood ratio χ^2 test of model fit, comparative fit index (CFI), and root mean square error of approximation (RMSEA) and its 95% confidence interval were used to adjudicate fit of the configural model. An excellent model fit would be reflected by a statistically nonsignificant χ^2 , a CFI close to 1, and RMSEA of .05 or less with a 95% confidence interval that includes zero (see Kline 2016).

With a well-fitting configural model, a series of sequential models were conducted to test for metric invariance (item factor loading invariance), scalar invariance (item intercept invariance), and residual variance invariance (item uniqueness invariance) across the two measurement occasions. When testing for scalar and residual invariance, the mean and variance of the FFS latent factor at time 2 were freely estimated in the model because factor means are partly a function of the item intercepts (see Newsom, 2015). The nested models were compared using chi-square difference tests ($\Delta\chi^2$). Strict temporal measurement invariance is established when factor loadings, intercepts, and residual variances for identical items across measurement occasions are equal. After establishing strict temporal invariance, we tested whether there was a difference between the FFS latent factor means and variances at times 1 and 2 while maintaining measurement invariance equality constraints. This was accomplished by testing whether an equality constraint on the latent factor means and variances worsens model fit.

Concurrent validity of the FFS was assessed by examining associations between FFS and PGSI at times 1 and 2. In addition, if FFS and PGSI scores changed from times 1 to 2, then we examined whether change in FFS correlates with change in PGSI using a latent difference score model (see McArdle, 2009). The latent difference score model is akin to conducting a paired

samples *t*-test (see Coman et al., 2013) for each of FFS and PGSI simultaneously. In the model, we regressed the latent difference score for each of FFS and PGSI on its time 1 counterpart to examine the correlation between the residualized difference scores of FFS and PGSI. Doing so facilitates the interpretation of the association between FFS and PGSI difference scores as being due to variability that is unexplained by FFS and PGSI at time 1. Model fit was adjudicated using the likelihood ratio χ^2 test, CFI, and RMSEA, but with robust standard errors because PGSI scores are not normally distributed.

Results

Temporal measurement invariance. Descriptive statistics and correlations between the four FFS items on both measurement occasions are reported above the diagonal in Table 1. The configural invariance model provided an excellent fit to the data, $\chi^2(15) = 20.04$, $p = 0.17$, CFI = 0.99, and RMSEA = 0.05 [.00, .10]. The metric invariance model did not fit worse than the configural invariance model, $\Delta\chi^2(4) = 4.34$, $p = 0.36$. Likewise, the scalar invariance model did not fit significantly worse than the metric invariance model, $\Delta\chi^2(4) = 0.16$, $p = 0.99$. Further, the residual variance invariance model did not fit significantly worse than the scalar invariance model, $\Delta\chi^2(2) = 4.85$, $p = 0.09$. The findings show that the 4-item FFS has strict measurement invariance over time. Standardized factor loadings as well as unstandardized intercepts and residual variances are reported in Table 2. There was a moderate-to-large positive correlation between the latent FFS factors at times 1 and 2, $r = .67$, $z = 11.42$, $p < .001$.

Next, we tested whether there was a difference between the latent factor means and variances of FFS over time in the context of strict temporal invariance. Imposing equality constraints on the means and variances at times 1 and 2 did not worsen model fit relative to the

strict invariance model, $\Delta\chi^2(2) = 0.38, p = 0.83$. Thus, there was no change in FFS over a one-month period.

Concurrent validity. Descriptive statistics and zero-order correlations between FFS and the PGSI total score at times 1 and 2 are reported in the top diagonal of Table 3. FFS and PGSI were moderately and positively correlated at each time point and across time points. However, like FFS, there was no change in the PGSI total score from time 1 to time 2, $t(146) = -1.15, p = .25$. Indeed, based on the scoring criteria of the PGSI, at time 1, almost all participants were non-problem gamblers ($n = 139$; 94.6%; i.e., a PGSI total score of zero), few were at low risk for gambling problems ($n = 5$; 3.4%; i.e., a PGSI total score between 1 and 2), even fewer were at moderate risk for gambling problems ($n = 4$; 1.4%; i.e., a PGSI total score between 3 and 7), and only one was at high risk for gambling problems (.7%; i.e., a PGSI total score above 8). At time 2, almost all participants were non-problem gamblers ($n = 142$; 95.5%), few were at low risk for gambling problems ($n = 3$; 2%), one was at moderate risk for gambling problems (.7%), and only one was at high risk for gambling problems (.7%). Thus, we did not estimate the latent difference score model to examine whether change in FFS is accompanied by change in PGSI.

Discussion

The findings of Study 1 are significant because they demonstrate that the same financially focused self-concept construct is being measured over time. In terms of stability, we observed a moderate-to-strong positive correlation between financial focus at time 1 and 2, which suggests that the relative rank-order of participants was stable over time. These findings were observed over a one-month period and there was no mean difference in financial focus over time.

In terms of concurrent validity, financial focus and disordered gambling severity were positively correlated at each assessment and across assessments. However, because there was little or no change in financial focus and disordered gambling severity, we could not assess whether change in financial focus accompanies change in disordered gambling severity. The lack of change is not surprising given the short duration (one month) between assessments. As such, we examined the longitudinal measurement invariance, stability, and concurrent validity of the financially focused self-concept construct over a longer duration in Study 2.

Study 2

Method

Participants, procedure, and materials. Participants were recruited from a large pool of newly enrolled undergraduate university students at the beginning of the 2017-2018 academic year. Students were eligible to participate in our study if they indicated that they have engaged in gambling activities (e.g., slot machines, poker, blackjack, roulette, sports betting) and had done so within the past 12 months. A total of 308 students (94 men and 214 women) were eligible. They ranged in age from 17 to 63 ($M = 21.29$, $SD = 6.72$) years.

All 308 participants initially completed a brief survey that included the 4-item FFS ($\alpha = 0.776$) and PGSI ($\alpha = 0.902$). We re-contacted all 308 participants from the initial session approximately 6-7 months later to complete a brief follow-up survey. The follow-up survey included the 4-item FFS ($\alpha = 0.728$) and PGSI ($\alpha = 0.845$), among other questionnaires (see OSF). Participants were instructed to complete the PGSI for the period from Fall 2017 (i.e., the initial time point) to the present. A total of 135 students (45 men and 90 women) completed the follow-up survey, but four participants did not complete the PGSI. Participants with missing data on the PGSI were included in the analyses using maximum likelihood (see Enders, 2010).

Participants ranged in age from 17 to 63 years ($M = 21.56$, $SD = 6.63$). Thus, the data of 135 participants who completed the survey on both measurement occasions were included in the analyses. The data analytic plan was identical to that of Study 1.

All participants provided informed consent and received course credit for participating in the second wave of data collection. The first authors' Research Ethics Board approved Study 2.

Results

Temporal measurement invariance. Descriptive statistics and correlations between all FFS items on both measurement occasions are reported in the top diagonal of Table 2. The configural invariance model provided a marginal fit to the data, $\chi^2(15) = 30.38$, $p = 0.01$, CFI = 0.96, and RMSEA = 0.09 [.04, .13]. Modification indices suggested that the inclusion of three residual covariances would enhance model fit. These covariances were between “The opportunities that are available to me depend on the amount of money I have” at time 2 and “People will think less of me if I don’t have a lot of money” at times 1 and 2 as well as between “The opportunities that are available to me depend on the amount of money I have” and “People will think less of me if I don’t have a lot of money” both at time 1. The inclusion of the three residual covariances improved model fit, $\Delta\chi^2(3) = 12.56$, $p = 0.005$. The revised configural model provided an excellent fit to the data, $\chi^2(12) = 17.44$, $p = 0.12$, CFI = 0.98, and RMSEA = 0.06 [.00, .11]. The metric invariance model did not fit worse than the configural invariance model, $\Delta\chi^2(4) = 2.51$, $p = 0.64$. Likewise, the scalar invariance model did not fit significantly worse than the metric invariance model, $\Delta\chi^2(8) = 1.80$, $p = 0.99$. Further, the residual variance invariance model did not fit significantly worse than the scalar invariance model, $\Delta\chi^2(4) = 2.20$, $p = 0.70$. Standardized factor loadings as well unstandardized intercepts and residual variances

are reported in Table 3. There was a moderate-to-large positive correlation between the latent factors of FFS at times 1 and 2, $r = .69$, $z = 8.89$, $p < .001$.

Next, we examined whether there was a difference in the mean and variance of the FFS latent factors at time 1 and time 2 in the context of strict measurement invariance. Constraining the mean and variance of each latent factor to be equal to at times and 2 worsened model fit, $\Delta\chi^2(2) = 16.05$, $p = 0.0003$. The reason is that there was a small-to-moderate increase in the latent mean of FFS from time 1 to time 2, $B = .32$, $z = 3.91$, $p < .001$.

Concurrent validity. Descriptive statistics and correlations between the observed variables for FFS and PGSI total score at times 1 and 2 are reported in the bottom diagonal of Table 1. Four participants did not complete the PGSI at time 2. There were moderate and positive correlations between FFS and PGSI at each time point and across time points. Like FFS, there was an increase in the PGSI total score from time 1 to time 2, $t(130) = 6.87$, $p < .001$. Based on the scoring criteria of the PGSI, at time 1, 61.5% of participants were non-problem gamblers ($n = 83$), 30.4% were at low risk for gambling problems ($n = 41$), 5.2% were at moderate risk for gambling problems ($n = 7$), and 3% were at high risk for gambling problems ($n = 4$). At time 2, 31.1% were non-problem gamblers ($n = 42$), 37% were at low risk for gambling problems ($n = 50$), 21.5% were at moderate risk for gambling problems ($n = 29$), and 7.4% were at high risk for gambling problems ($n = 10$).

Thus, we examined whether an increase in FFS from time 1 to time 2 correlates positively with an increase in the PGSI total score from time 1 to time 2 using a latent difference score model. The model provided an excellent fit to the data, $\Delta\chi^2(2) = 2.74$, $p = 0.25$, CFI = 1, and RMSEA = .05 [.00, .19]. Results showed that the increases in FFS and PGSI from time 1 to time 2 were positively associated, $covariance = .23$, $z = 2.044$, $p = .04$, $r = .18$.

Discussion

The results of Study 2 replicate and extend Study 1 with a sample of university students who gamble. More specifically, we observed that the 4-item FFS has strong temporal measurement invariance over 6-7 months. As in Study 1, we observed a moderate-to-strong positive correlation between the financial focus latent factors at times 1 and 2. This finding suggests that the relative rank-order of participants remains the same over a one-month period (Study 1) and a 6-7 month period (Study 2). Unlike Study 1, we observed a small-to-moderate increase in the latent factor means of financial focus. Of note, this analysis statistically controlled for measurement error in the observed FFS indicators using latent variables. As such, Study 2 is the first to show that individuals' financial focus can change over time.

In terms of concurrent validity, like Study 1, the observed measures of financial focus and disordered gambling severity were positively correlated within and across assessments. However, unlike Study 1, there was a small-to-moderate increase in the observed measures of financial focus and disordered gambling severity over the 6-7-month period. Of note, the increase in financial focus was positively correlated with the increase in disordered gambling severity.

Studies 1 and 2 measurement invariance of the 4-item FFS across community and student players

Thus far, we showed that the same financially focused self-concept construct is being measured over time among community (Study 1; $N = 147$) and student (Study 2; $N = 135$) players. To examine whether the same financially focused self-concept construct is being measured among different types of players, we tested whether the 4-item FFS is invariant across community and student gamblers at time 1. To accomplish this, we first estimated a multi-group

configural model to examine whether the same factor configuration exists among community and student gamblers, respectively. As determined in Study 2, a residual correlation was included between the item “The opportunities that are available to me depend on the amount of money I have” and “People will think less of me if I don’t have a lot of money” for student gamblers. With a well-fitting configural model, we then tested a sequential series of models that constrained model parameters to be equal across community and student gamblers, which were the metric invariance model (item factor loadings are constrained to be equal) and scalar invariance model (item intercepts are constrained to be equal).

Although item residual invariance is not a prerequisite for testing mean differences between groups on a latent factor (see Vandenberg & Lance, 2000), we examined the residual invariance model (item residual variances are constrained to be equal) because it is included in many tests of measurement invariance. As such, with at least partial scalar invariance, we proceeded to explore differences in factor variances and means between community and student gamblers. Model estimation, fit, and comparisons were conducted as in Studies 1 and 2.

The configural model provided a good fit, $\chi^2(3) = 7.712, p = 0.05$, CFI = 0.99, and RMSEA = 0.12 [.00, .20]. The metric invariance model did not fit worse than the configural invariance model, $\Delta\chi^2(3) = 2.03, p = 0.57$. However, the scalar invariance model did fit significantly worse than the metric invariance model, $\Delta\chi^2(3) = 17.04, p = 0.0007$. Modification indices indicated that freeing the equality constraint on the intercept for item “The opportunities that are available to me depend on the amount of money I have” would enhance model fit. Indeed, the scalar invariance model did not fit worse than the metric invariance model after freeing the equality constraint, $\Delta\chi^2(2) = 2.04, p = 0.36$. Community players had a lower intercept value on the non-invariant item compared to student players (see Table 4). Thus, the results

indicate that the 4-item FFS has partial measurement invariance across community and student players.

Furthermore, the residual variance invariance model fit significantly worse than the partial scalar invariance model, $\Delta\chi^2(4) = 86.86, p < 0.001$. Modification indices indicated that all equality constraints on the residual variances would need to be removed to enhance model fit. As well, the model in which factor means were held equal across groups fit worse than the partial scalar invariance model, $\Delta\chi^2(1) = 13.35, p = 0.003$. Likewise, the model in which factor variances were held equal across groups fit worse than the partial scalar invariance model, $\Delta\chi^2(1) = 5.71, p = 0.02$. Results indicated that the factor mean for student players was lower than the factor mean for community players, $B = -0.39, z = -2.38, p = 0.02$. As well, the variance of the factor mean for student players was larger than the variance of the factor mean for community players, $B = 2.09, z = 5.03, p < 0.001$. Taken together, community players were more financially focused than student players, and there was greater variability in financial focus among student players relative to community players.

General Discussion

Financially focused self-concept is theorized to play a role in the etiology and maintenance of disordered gambling (e.g., Tabri, Salmon, et al., in press). However, almost all published research on financially focused self-concept relied on cross-sectional research designs, which limits the ability to make causal inferences. Thus, longitudinal and experimental research designs are needed to understand the nature of the relation between financially focused self-concept and gambling outcomes. However, some of the key assumptions of longitudinal and experimental research are that constructs are measured in the same way over time and across comparison groups. Herein, we addressed this issue and found that the financially focused self-

concept construct has strong temporal measurement invariance among community members (Study 1) and among university students (Study 2) who gamble.

We also found that the financially focused self-concept construct has partial measurement invariance across community and university students who gamble. Together, these findings provide strong prerequisite support for some of the key assumptions of longitudinal and experimental research designs. As such, researchers interested in examining financially focused self-concept over time, among different groups of people who gamble, or both can proceed with more confidence in the psychometric properties of the 4-item FFS scale.

Implications and directions for future research

An important contribution of the current research was the moderate-to-strong correlation between financial focus at times 1 and 2 in Studies 1 and 2. This correlation is analogous to a test retest correlation coefficient. What is remarkable is that the correlation coefficient was virtually identical in Studies 1 and 2 despite the different durations of time between assessments in Study 1 (one month) and Study 2 (6-7 months). Moreover, the magnitude of the correlation between financial focus at times 1 and 2 in Studies 1 and 2 is consistent with longitudinal research on having a focused self-concept in the domain of appearance measured three weeks apart among university students (see Spangler & Stice, 2001) and measured 10 and 20 months apart among adolescent women (Spangler, 2002). Together, these findings suggest that the relative rank order of participants in terms of their financial focus is stable and this degree of stability may be generalizable to having a focused self-concept in other domains.

The current findings also add to the literature by demonstrating that people's financial focus can change, on average, when observed for more than a month. Indeed, in Study 1, the mean values for financial focus over a one-month period were similar. In contrast, in Study 2, we

found that financial focus moderately increased over a 6-7-month period even after controlling for measurement error, which effectively rules out regression towards the mean as an alternative explanation of the observed change. Thus, the observed change in financial focus over the 6-7 months period in Study 2 reflects “true” change. Of note, the increase in financial focus observed in Study 2 was positively associated with an increase in disordered gambling severity, which supports the concurrent validity of change in financial focus.

However, given that financial focus and disordered gambling were measured on two assessments only, it is unclear to know whether an increase in financial focus predicts a subsequent increase in disordered gambling, whether an increase in disordered gambling predicts a subsequent increase in financial focus, or both. As such, a direction for future research is to examine the shape and rate of change in financial focus over time using three or more assessments and whether change in financial focus has prognostic importance for understanding the onset and maintenance of gambling disorder.

Furthermore, the current research contributes to a small body of research that has examined the association between change in a focused self-concept and change in psychological impairment and distress. For example, Cooper and Fairburn (1993) showed that an increase in appearance focused self-concept over 10-12 weeks was accompanied by a decrease in self-esteem and an increase in depressive symptoms severity among people diagnosed with bulimia nervosa. Masheb and Grilo (2003) replicated and extended these results in a sample of people diagnosed with binge eating disorder over a 4-week period. The current research extends this body of work to the realm of behavioral addiction, namely disordered gambling. Together, these results suggest that increases in a focused self-concept are linked to increases in severity of psychiatric problems.

From a psychometric standpoint, the current research helped establish that three of the four FFS items were invariant across community and student players with the item “The opportunities that are available to me depend on the amount of money I have” being only partially invariant (i.e., the factor loading was invariant, but the intercept was not invariant). Of note, community players were more financially focused than student players in terms of the latent factor mean, but student players scored higher on the partially non-invariant observed item compared to community players. This finding suggests that student players agree more with the view that having more money facilitates opportunities compared to community players. This difference may be, partly, due to student players being much younger and thus less financially established compared to the community players who were older (with most being at least the age of retirement) and thus more financially established. Although no prior research has directly compared the money attitudes of student and community members who gamble, published research suggests that college students who gamble have more anxious attitudes towards money (e.g., I worry that I will not be financially secure; see Lostutter et al., 2019) compared to community members who gamble (Blaszczynski & Nower, 2010). Because age and financial standing are likely positively correlated, it would behoove researchers to examine whether the measurement of the financially focused self-concept construct is invariant across a range of income groups balanced by age.

Furthermore, replicating and extending prior research, we observed that financial focus was positively associated with disordered gambling severity in Studies 1 and 2. Of note, a tacit assumption of prior and current research is that the financially focused self-concept construct is being measured in the same way across people who gamble without problems and people who gamble with varying degrees of problems. As such, researchers should investigate and confirm

that the measurement of the financially focused self-concept construct is invariant across different groups of players defined by having no gambling problems as well as different thresholds of gambling problems.

Conclusions

The current research is the first to demonstrate that the measurement properties of the 4-item FFS scale used to measure the financially focused self-concept construct transcend time and demographic groups of people who gamble (younger students and older community members). We also observed that an increase in financial focus was accompanied by an increase in disordered gambling severity. Together, these findings bolster the psychometric properties of the FFS scale and promote its use in longitudinal and comparative gambling research.

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Table 1.

Descriptive statistics and inter-correlations for all items in the FFS at both measurement occasions in Studies 1 and 2.

	<i>M(SD)</i>	1	2	3	4	5	6	7	8	<i>M(SD)</i>
1. FFS1 Time 1	1.35(1.14)	—	0.74**	0.53**	0.50**	0.47**	0.55**	0.35**	0.34**	1.65(0.76)
2. FFS2 Time 1	1.57(1.16)	0.69**	—	0.45**	0.44**	0.41**	0.58**	0.28**	0.26**	1.73(0.77)
3. FFS3 Time 1	1.21(1.18)	0.49**	0.41**	—	0.47**	0.32**	0.42**	0.62**	0.36**	1.44(0.71)
4. FFS4 Time 1	2.46(1.26)	0.40**	0.40**	0.42**	—	0.27**	0.41**	0.37**	0.57**	2.19(0.99)
5. FFS1 Time 2	1.61(1.13)	0.55**	0.51**	0.29**	0.27**	—	0.69**	0.54**	0.52**	1.69(0.75)
6. FFS2 Time 2	1.93(1.10)	0.56**	0.53**	0.21*	0.28**	0.70**	—	0.53**	0.57**	1.75(0.77)
7. FFS3 Time 2	1.49(1.13)	0.25**	0.24**	0.47**	0.28**	0.43**	0.36**	—	0.36**	1.45(0.65)
8. FFS4 Time 2	2.60(1.13)	0.33**	0.31**	0.23**	0.47**	0.25**	0.31**	0.36**	—	2.23(1.01)

Note. FFS = financially focused self-concept. FFS1 = How I feel about myself is largely based on the amount of money I have; FFS2 = My moods are influenced by the amount of money I have; FFS3 = People will think less of me if I don't have a lot of money; FFS4 = The opportunities that are available to me depend on the amount of money I have. Descriptive statistics and correlations above the diagonal are for Study 1 and descriptive statistics and correlations below the diagonal are for Study 2.

* $p < .05$; ** $p < .01$.

Study 1 $N = 135$ and Study 2 $N = 147$.

Table 3.

Descriptive statistics and inter-correlations between FFS and PGSI in Studies 1 and 2

Variable	<i>M(SD)</i>	1	2	3	4	<i>M(SD)</i>
1. FFS Time 1	1.65(0.92)	—	.28**	.63**	.29**	1.75(0.64)
2. PGSI total score Time 1	1.13(2.80)	0.19*	—	.25**	.95**	0.19(1.45)
3. FFS Time 2	1.91(0.83)	0.63**	0.07	—	.23**	1.78(0.65)
4. PGSI total score Time 2	2.36(3.36)	0.21*	0.80**	0.17 [†]	—	0.13(0.92)

Note. FFS = financially focused self-concept; PGSI = problem gambling severity index. Descriptive statistics and correlations above the diagonal are for Study 1 and descriptive statistics and correlations below the diagonal are for Study 2. Sample size for descriptive statistics and correlations in Study 2 for PGSI at time 2 is 131 because four participants had missing PGSI data at T2.

[†] $p = .05$; * $p < .05$; ** $p < .01$.

Study 1 $N = 147$ and Study 2 $N = 135$.

Table 4

Measurement invariance parameters of the FFS items across community (Study 1) and student players (Study 2)

[illegible]