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A systematic literature review of studies on attitudes towards gambling using the Attitudes Towards Gambling Scale (ATGS)

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ABSTRACT

Several studies have investigated attitudes toward gambling using the Attitudes Towards Gambling Scale (ATGS), however, their findings have not previously been synthesized or systematically reported. Thus, we conducted a systematic literature review on studies employing the ATGS to summarize the current evidence. Database searches were conducted in January 2022 in Cinahl, Embase, PsycInfo, Pubmed, Web of Science, GreyNet, and Google Scholar. Papers were included if they presented data based on the ATGS and were published in a European language. Twenty-six papers presenting the results from 23 unique studies met the inclusion criteria. Two reviewers independently extracted the data and assessed the risk of bias. Most of the studies were cross-sectional and used the short (8-item) version of ATGS. The synthesis indicates an overall incline towards negative attitudes. More positive attitudes were associated with being male, younger age, and higher gambling frequency. Studies were divergent in findings concerning problem gambling and gambling attitudes, which could be due to variance in problem gambling severity in the samples. The current evidence base is encumbered by limitations in study quality and designs. Future research should emphasize longitudinal designs, include non-western samples, and investigate the directionality and causality of variables associated with attitudes towards gambling.

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Introduction

Gambling is a popular, yet controversial activity. For many, gambling is an exciting pastime activity offering a way to socialize with friends, family and community (Latvala et al., 2019). Gambling has also a positive impact on society in terms of employment, increased state revenues, and by providing revenues for sporting clubs and humanitarian organizations (Rossow & Hansen, 2016; Walker & Jackson, 2011). Many, however, associate gambling with the negative consequences a minority of gamblers experience. Problem gambling has been found to be associated with several adverse outcomes, including financial problems (e.g. unmanageable debts), legal problems, job loss,

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relationship problems, decreased mental and physical health, and even suicide (Adolphe et al., 2019; Black et al., 2012; Karlsson & Håkansson, 2018; Lorains et al., 2011). Such harms extend beyond the individual gambler as it often also affects their close others, extended family, employers, as well as society as a whole given the costs of e.g. treatment and the need for regulation (Hofmarcher et al., 2020; Kalischuk et al., 2006). The prevalence of problem gambling varies, but most studies report prevalence rates among adults in the range of 0.12% to 5.8% across cultures (Calado & Griffiths, 2016).

The presence, knowledge, and experience of positive and negative consequences associated with gambling contribute to shaping people's opinions or *attitudes* toward gambling. Attitudes can be understood as 'a relatively enduring and general evaluation of an object, person, group, issue or concept on a dimension ranging from negative to positive' (American Psychological Association, n.d.). According to the theory of planned behavior (Ajzen, 1991), attitudes indirectly influence behavior as attitudes, in addition to subjective norms and perceived behavioral control, determine the intention to engage in a behavior. Consequently, the theory postulates that to practice a given behavior one possesses a particular attitude (Wood & Griffiths, 2004). Based on this theoretical notion, research on attitudes towards gambling has received increased interest in the past few decades (Plotka et al., 2016). Affirmatory with the theory of planned behavior, a number of studies have found more acceptant or positive attitudes toward gambling to be associated with a higher gambling frequency (Chiu & Storm, 2009; Delfabbro & Thrupp, 2003; Hardoon & Derevensky, 2002; Williams et al., 2006; Wood & Griffiths, 2004) and gambling-related problems (Chiu & Storm, 2009; Delfabbro & Thrupp, 2003; Williams et al., 2006; Wood & Griffiths, 2004), albeit the latter has not been found consistently (Salonen et al., 2014). Hence, measuring attitudes towards gambling could be useful for predicting gambling behavior and to possibly identify individuals with a risk of developing problem gambling.

For most studies that have investigated attitudes toward gambling in the general population, the mean score on attitudes towards gambling has generally been negative or, at best, ambivalent (Delfabbro & King, 2020; Smith et al., 2011). Some studies have found that males hold more positive attitudes compared to women (Buczkievicz et al., 2007; Jackson et al., 2008; Kassinove, 1998; Moore & Ohtsuka, 1997; Peltzer & Thole, 2000; Smith et al., 2011; Taormina, 2009; Wood & Griffiths, 1998). The most common finding regarding age is that young people tend to have more favorable attitudes towards gambling than older people (Smith et al., 2011; Taormina, 2009).

A handful of instruments assessing attitudes toward gambling has been developed, including the Gambling Attitude and Belief Survey (Breen & Zuckerman, 1999), the Gambling Attitude Scale (Kassinove, 1998), and the Casino Attitude Scale (Sutton & Griffiths, 2008). However, findings based on these different instruments have certain limitations in terms of comparability as these measures differ in the overall construct captured (e.g. to the extent it includes cognitive biases) as well as vary in the specific gambling activity considered. These issues lead to the development of the *Attitudes Towards Gambling Scale* (ATGS; Orford et al., 2009). The ATGS was originally developed for the British Gambling Prevalence Survey 2007 (Wardle et al., 2007), and has since become a widely used measurement as it is regarded as a robust and standardized measure of gambling attitudes that can be administered to gamblers as well as non-gamblers (Canale et al., 2016). The scale differs from previous measures of gambling

attitudes, as it aims to measure more generic attitudes toward gambling that is independent of the influence of attitudes related to particular forms of gambling activities (e.g. casino gambling, horse track betting, lotteries) and gambling-related policy issues (Orford et al., 2009). There are currently two versions of ATGS; the original longer version consisting of 14 items (ATGS-14; Orford et al., 2009) and a shorter version consisting of eight items (ATGS-8; Canale et al., 2016). Both scales include statements that are scored on a 5-point Likert scale, ranging from *strongly agree* (1) to *strongly disagree* (5). Half of the items in each scale are reversed when deriving the mean score. Higher mean scores indicate more positive attitudes, and a total score above 42 on the ATGS-14 or 24 on the ATGS-8 indicates a positive attitude toward gambling (Wardle et al., 2007, 2010).

Although several studies on attitudes toward gambling have been conducted using the ATGS, findings have been somewhat inconsistent across studies. Moreover, considering the issues of comparability of findings deriving from different studies using different instruments, a synthesis of studies employing the ATGS specifically would advance the field by consolidating the evidence base and clarifying conflicting findings. Against this backdrop, we conducted a systematic literature review of studies on attitudes towards gambling based on the ATGS. Two research questions were investigated: (1) ‘What characterizes studies on attitudes towards gambling that have used the ATGS?’ and (2) ‘What are the main findings from the studies using the ATGS?’.

Methods

Search strategy

The current systematic literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)-guidelines (Page et al., 2021). The review was pre-registered at the PROSPERO International prospective register of systematic reviews (<https://www.crd.york.ac.uk/PROSPERO/>; record ID: CRD42022311675). Literature searches without time constraints were completed on January 27th, 2022, and conducted in Cinahl, Embase, PsycInfo, Pubmed, Web of Science, GreyNet, and Google Scholar electronic databases. Search items comprised *gambl** AND *attitude** and were entered similarly in each database without the use of any MeSH or other expanders. The database searches yielded 5188 initial results, with 628 hits in Cinahl, 920 in Embase, 1332 in PsycInfo, 1003 in Pubmed, 1105 in Web of Science, 0 hits on GreyNet. Due to a large number of hits in Google Scholar (over 23,000 hits), only the 200 first hits were included for screening. In addition, the reference lists of included manuscripts were screened to identify potential manuscripts that were not identified in the formal literature searches. The reference screening was conducted by two reviewers which examined the titles of the referred papers for words related to *gambling* and *attitudes* and then investigated whether the reference of interest had previously been included in the formal search- and screening process. However, no additional potentially relevant manuscripts were identified and included for further screening by this method. Lastly, we included one gray literature report on problem gambling (Pallesen et al., 2020) that was not identified by the formal literature searches as we already were familiar with the contents of this report.

Selection process

The identified records were imported into Endnote reference manager software which was used to remove duplicate records and organize the selection process. Two reviewers independently screened the title and abstracts of the records to sort out non-relevant records before assessing the full-text manuscript against the inclusion criteria. To be included in the present review, the studies had to: (1) present original quantitative data on attitudes toward gambling based on the Attitude Towards Gambling Scale (ATGS) and (2) be published in a European language. No further restrictions were applied regarding data, geographic location, setting, or study design. Exclusion criteria were that the articles were (1) reviews or other papers presenting secondary data, (2) qualitative studies, and (3) abstracts or conference presentations.

Data extraction and risk of bias assessment

Two reviewers extracted the data independently from the included articles using a coding scheme made for the present review and compiled the data in an Excel spreadsheet. The coding scheme encompassed information concerning the manuscript's registration details, study setting, participant's characteristics, methodology, and main findings. Manuscripts varied whether they reported adjusted estimates, unadjusted estimates, or both. If the paper presented both adjusted and unadjusted estimates, we chose to only extract and present findings based on adjusted estimates. In several cases, the included articles did not contain the necessary information to extract all relevant data or lacked proper descriptions of results. In such cases, the corresponding authors were contacted and asked to provide the missing information or clarifications. Four out of 19 contacted authors replied, providing minor clarifications, but no additional data was provided. Following individual coding of descriptive statistics and the main findings, the proportionate level of inter-reviewer agreement was calculated to be 83.0%. Disagreements were resolved by consulting the original article and through discussions.

The Mixed Methods Appraisal Tool 2018 version (MMAT; Hong et al., 2018) was used to assess the risk of bias in the included studies. MMAT is an assessment tool to appraise articles for reviews including multiple study designs. It reviews the methodological quality of qualitative, quantitative, and mixed methods studies. There are five quality criteria for each of the following five categories of study designs: (1) qualitative, (2) randomized controlled, (3) non-randomized, (4) quantitative descriptive, and (5) mixed methods. MMAT consists of a general screening and a specific assessment related to the appropriate study design. The criteria are rated by responding 'yes', 'no', or 'can't tell', and provides a general assessment of the study's risk of bias. The MMAT assessment was conducted for each manuscript, rather than for each unique study. The level of inter-reviewer agreement for coding the risk of bias in MMAT was 78.1%. Discrepancies were settled by consulting the original article and discussions between the reviewers.

Results

Study selection

An overview of the study screening and selection process can be found in [Figure 1](#). After removing the duplicate records ($N = 2098$), the titles and abstracts of the remaining 3090 manuscripts were screened, resulting in 295 full-text manuscripts that were assessed against the inclusion and exclusion criteria. From this pool, 270 manuscripts were excluded as they did not specifically report data based on the ATGS. Thus, 26 manuscripts that reported results from 23 unique studies were assessed as eligible for inclusion and were included in the current review. Disagreement between the authors in the study full-text assessment was detected for five manuscripts which were resolved through discussion. The total agreement percentage before the discussion amounted to 80%.

Study characteristics

The study characteristics and key findings are summarized in [Table 1](#). There has been a considerable increase in published studies using the ATGS after 2018. Most of the studies include participants from Europe, Australia, and the USA, except for one sample of Nigerian participants (Ayandele et al., 2021), and one study from Israel (Gavriel-Fried, 2015). In addition, one study (Delfabbro et al., 2021, 2021) compared participants from Australia, Croatia, Israel, and Canada. For nine studies, the target populations comprised the general population, one study comprised adults, while ten studies targeted youths/adolescents and young adults (including high school and university students; see [Table 1](#)). Two of the 23 studies included more specific samples of ex-offenders (Rosen et al., 2020) and individuals from Ukraine and Vietnam living in the Czech Republic (Fiedor & Seidlova, 2021). Sample sizes ranged from $N = 111$ to $N = 9037$, and a total of

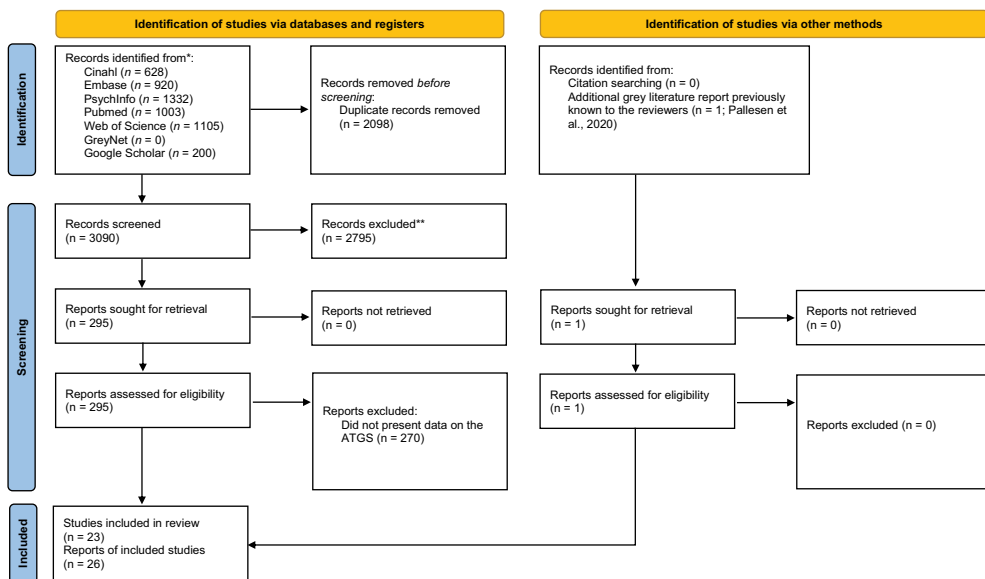


Figure 1. PRISMA flow chart.

Table 1. Study characteristics and key findings by the target population.

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
<u>General population</u> Andra et al. (2021)	704	Italy	General population	–	54.4	8	–	<ul style="list-style-type: none"> ● Problematic gamblers reported higher ATGS scores compared to non-/non-problematic gamblers. ● No gender difference on the ATGS was found. ● Level of education was inversely associated with ATGS scores.
Canale et al. (2016)	7746	United Kingdom	General population	46.4 (–)	52.0	8	–	<ul style="list-style-type: none"> ● ATGS scores were positively associated with gambling frequency. ● ATGS scores were positively associated with levels of gambling problems.

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Donaldson et al. (2015)	1794	Australia	General population	55.4 (13.3)	52.8	14	32.5/18.6 ^b	<ul style="list-style-type: none"> ATGS scores were positively associated with gambling frequency, gambling product diversity, time last gambled (recency), and game intensity, and inversely related to attitudes toward harm reduction and gambling reform legislation. ATGS scores were inversely related to PGSI score, being a woman, full-time employment, and education.

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Fiedor et al. (2018)	1076	Czech Republic	Inhabitants from a post-communist country/the general population of the Czech Republic	–	–	8	17.8	<ul style="list-style-type: none"> ● ATGS scores were positively related to gambling frequency. ● ‘Broader’ definition/conception of gambling was inversely associated with the ATGS. ● Younger age groups (except 20–29 years) reported more positive attitudes than compared to older age groups. ● Women reported more negative attitudes than men. ● Widows/widowers and married participants reported more negative attitudes than single/divorced.

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
McAllister (2013)	1213	Australia	General population	–	–	8	3.9 (out of 10)	<ul style="list-style-type: none"> • Frequent gamblers reported more positive attitudes than less frequent gamblers. • Frequency of general gambling was more strongly related to the ATGS than the frequency of scratch/lottery tickets. • The ATGS was inversely related to stricter public attitudes toward gambling regulation and explained a large proportion of the variance in the multivariate model. • Frequent church attendees had more negative attitudes on gambling than those less frequent or not attending church.

(Continued)



Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Orford et al. (2009, 2010)	8872	United Kingdom	General population	–	–	14	35.4/20.2 ^b	<ul style="list-style-type: none"> • Scores on the ATGS were positively associated with gambling frequency, the amount lost, amount won, younger age first started to gamble, scores on DSM-IV problem gambling criteria/PGSI, and having a parent that gambles. • Having a parent or close relative with problem gambling was inversely associated with the ATGS. • Male sex, younger age, white/European ethnicity, lowest school qualification, lower-status occupations, higher household income, better self-reported health, smoking, and heavy drinking were all associated with less negative attitudes toward gambling.

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Pallesen's et al. (2020)	9037	Norway	General population	44.6 (16.4)	51.3	8	F: 20.7 M: 22.7	<ul style="list-style-type: none"> ● Gambling participation last 6 months was positively associated with ATGS scores. ● Those who did not gamble or were categorized as problem gamblers (according to the PGSI) reported lower scores on the ATGS than normal-, low-risk- and moderate-risk gamblers. ● Those being single, not having children, having a lower income, and full-time employment had higher scores on the ATGS than their counterparts. ● Female gender, lower age, and the highest educational level were inversely associated with ATGS scores.

(Continued)



Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Salonen et al. (2014)	3497	Finland	General population	48.2 (16.8)	52.8	8	22.7	<ul style="list-style-type: none"> ● Problem gambling severity (SOGS) and being a concerned other of a problem gambler were inversely associated with ATGS scores. ● Net wage >2000 euro, and risky alcohol consumption were positively associated with ATGS scores. ● Female gender, higher age, and less than 12 years of education were inversely related to ATGS scores.
Salonen et al. (2017)	S1: 4484 S2: 4515	Finland	General population	–	S1: 52.8 S2: 48.9	8	2011 F: 21.4 2011 M: 23.9 2015 F: 22.9 2015 M: 25.2	<ul style="list-style-type: none"> ● Participants reported overall higher ATGS scores in S2 compared to S1. ● Change in ATGS score was not significant among men aged 15–17- and 18–24-years, and women aged 15–17 years. ● Women generally reported lower ATGS scores than men.

Adolescents/young adults

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Ayandele's et al. (2021)	197	Nigeria	Youths	22.8 (3.2)	16.2	8	28.2	<ul style="list-style-type: none"> Higher gambling frequency was related to higher ATGS scores. Age was inversely associated with the ATGS scores.
Calado et al. (2017)	988	United Kingdom	Adolescents and young people	19.8 (-)	40.8	8	-	<ul style="list-style-type: none"> ATGS scores did not predict problem gambling status.
Calado et al. (2019)	111	Portugal	High school students	17.6 (1.6)	58.5	8	-	<ul style="list-style-type: none"> Participants in the intervention group reported reduced ATGS scores at the last session of intervention. Changes in ATGS scores were not associated with problem gambling status. The main effect was not significant at follow-up six weeks after the intervention.

(Continued)



Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Delfabbro et al. (2021,2021)	1787	Australia Croatia Israel Canada	University students	Australia: 19.6 (2.1) Israel: 18.0 23.3 (2.8) Croatia: 21.6 (2.5) Canada: 21.0 (2.4)	64.0	8	Australia: 19.8 Israel: 18.0 Croatia: 18.7 Canada: 21.4	<ul style="list-style-type: none"> • Canadian respondents had the highest ATGS scores followed by Australia, Croatia and Israel. • Participants who gambled regularly reported more positive attitudes toward gambling than those who were not regular gamblers. • Women reported lower scores on the ATGS than men. • Gambling attitudes correlated positively with social accessibility and positive attitudes toward (strict) gambling regulation. • Gambling attitudes were inversely and weakly related to exposure to people with gambling problems. • Gambling attitudes were inversely associated with stigma (ostracism and contempt).

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Dowling et al. (2020)	499	Australia	–	23.2 (–)	56.1	8	26.7	<ul style="list-style-type: none"> • Women reported higher ATGS scores than men • ATGS scores were unrelated to problem gambling.
Hanss et al. (2014, 2014)	1977	Norway	Adolescents Norwegian 17-year-olds	17 (–)	52.9	14	37.7/21.5 ^b	<ul style="list-style-type: none"> • Problematic gambling (PGS) was inversely related to ATGS scores. • Lifetime gambling and peer/family approval of gambling were positively associated with ATGS scores. • ATGS scores were inversely associated with female gender, agreeableness, and positively associated with sensation seeking.
Kaakinen et al. (2019)	S1: 1200 S2: 230	Finland	Young people	S1: 21.3 S2: 24.4	S1: 50.0 S2: 53.0	8	S1: 23.4 S2: 24.0	<ul style="list-style-type: none"> • Respondents with more positive gambling attitudes reported higher positive interest in pro-gambling messages in a vignette experiment.

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Oksanen et al. (2019)	1200	Finland	Finnish young people	21.2 (2.8)	50.0	8	23.4	<ul style="list-style-type: none"> • ATGS scores were positively associated with frequency of competent- and entertainment-type gambling.
Pallesen et al. (2016)	W1: 2055 W2: 1239	Norway	Adolescents	W1: 17.5 W2: 18.5	70.4	14	W1: 37.7/21.5 ^b W2: 38.7/22.1 ^b	<ul style="list-style-type: none"> • Adolescent participants significantly had more positive attitudes toward gambling in W2 compared to W1. • ATGS scores at W1, gambling only at W2, gambling both at W1 and W2, and family and friends' approval of gambling positively predicted ATGS scores at W2. • Female gender and neuroticism were inversely related to ATGS score.

(Continued)

Table 1. (Continued).

Reference	N	Country	Target population ^a	Mean age (SD)	% women	ATGS version	ATGS mean scores	Key reported findings
Fiedor and Seidlova (2021)	171	Czech Republic	People from Vietnam and Ukraine living in the Czech Republic	–	–	8	Ukraine: 18.0 Vietnam: 18.3	<ul style="list-style-type: none"> Individuals who participated in more games in the past year reported higher ATGS scores than those who did not- or participated in fewer games per year. The Ukrainians and Vietnamese reported slightly more positive attitudes than the Czech majority (compared to the results from Fiedor et al., 2018).
Rosen et al. (2020)	126	USA	Ex-offenders	32.5 (7.3)	13.0	8	21.5	<ul style="list-style-type: none"> Ex-offenders with gambling disorder reported higher ATGS scores than ex-offenders without gambling disorder. ATGS score was inversely related to the likelihood to seek treatment for gambling problems. Individuals with gambling disorder reported lower ATGS scores after a brief intervention, but the interaction effect of time x condition (treatment and control) was not significant.

– = did not report data on this variable, ATGS = Attitudes Towards Gambling Scale, ^a = The targeted population as reported by the individual manuscript, ^b = ATGS-14 score transformed to ATGS-8 score by the authors, W1 = first wave, W2 = second wave, S1 = first study, S2 = second study, PGS1 = the Problem Gambling Severity Index, SOGS = the South Oaks gambling Screen.

55,795 participants are included in the present synthesis. The mean age of the participants ranged from 17.0 to 55.4. However, seven studies did not report the mean age. For the 19 studies that reported data on gender, the gender distribution ranged from 13.0% to 75.4% women in the samples.

The majority of studies were cross-sectional ($k = 18$), while one was longitudinal (Pallesen et al., 2016), and four were experimental (Calado et al., 2019; Kaakinen et al., 2019; Rosen et al., 2020; Zhou et al., 2018). Regarding participant sampling, two studies (Gavriel-Fried, 2015; Kaakinen et al., 2019) used quota sampling, two (Fiedor & Seidlova, 2021; Rosen et al., 2020) used judgmental sampling, nine studies (Ayandele et al., 2021; Calado et al., 2017, 2019; Delfabbro et al., 2021, 2021; Dowling et al., 2020; Oksanen et al., 2019; Sanscartier et al., 2019; Zhou et al., 2018; Åndra et al., 2021) used convenience sampling, while the remaining ten studies employed simple random sampling. All in all, 70% of the included studies used the ATGS-8 while the remaining used the ATGS-14 (see Table 1). For most studies, the Cronbach's alphas reported were above .70, except for four studies (Calado et al., 2019; Delfabbro et al., 2021, 2021; Fiedor & Seidlova, 2021; Zhou et al., 2018) which reported an alpha between .53 and .67, indicating an internal consistency below the conventional acceptable level.

Main findings

Out of the 23 unique included studies, 19 reported a mean score on the ATGS of which 17 studies reported a mean score indicative of negative attitudes toward gambling (i.e. $M > ATGS-14 = 42/ATGS-8 = 24$, see Table 1). Only two studies (Ayandele et al., 2021; Dowling et al., 2020) reported a mean score that indicated positive attitudes, in addition to one sub-sample of men in one study (Salonen et al., 2017). In studies using the ATGS-14, the mean scores ranged from 32.5 to 37.0. The corresponding range for studies using the ATGS-8 was 17.8 to 28.2. One study (McAllister, 2013) transformed the response alternative to a 0–10 scale, which precludes direct comparison of results. One study (Salonen et al., 2017) compared attitudes towards gambling in two separate samples at two different time points. In that study, both men and women reported negative attitudes in 2011, but in 2015 the male sample was positive whilst the majority of the female sample remained negative. Pallesen et al. (2016) employed a longitudinal design to investigate whether adolescents' attitudes towards gambling would change when transcending from underage (17 years) to legal gambling age (18 years). Their results showed that the adolescents reported statistically significantly more positive attitudes (though still overall negative) towards gambling after they had turned 18 (wave 2) compared to one year earlier (wave 1).

In terms of associated variables, the most commonly investigated variables were gambling-related variables (i.e. gambling frequency and problem gambling severity), gender, age, and education. All studies except one (Hanss et al., 2014, 2014) that investigated gambling frequency found a positive relationship between gambling frequency and ATGS scores. The reports of the association between attitudes toward gambling and problem gambling were, however, somewhat more divergent. Two studies (Calado et al., 2017; Dowling et al., 2020) did not find any significant association between the ATGS and problem gambling severity. Four studies (Canale et al., 2016; Orford et al., 2009, 2010; Zhou et al., 2018; Åndra et al., 2021) reported a positive association between

problem gambling severity and attitudes towards gambling. Four studies (Donaldson et al., 2015; Gavriel-Fried, 2015; Hanss et al., 2014, 2014; Salonen et al., 2014) reported the opposite, indicating that higher problem gambling severity was associated with more negative attitudes towards gambling. Lastly, one study (Pallesen et al., 2020) found that participants that did not gamble or were categorized as a problem gambler reported more negative attitudes than normal- low-risk- and moderate-risk gamblers. In addition, three studies (Delfabbro et al., 2021, 2021; Orford et al., 2009, 2010; Sanscartier et al., 2019) reported that being exposed to or being a concerned other to a problem gambler was associated with more negative attitudes towards gambling compared to those not being exposed to or being a concerned other to a problem gambler.

Out of the 15 studies that investigated the associations with gender, 12 reported women to have more negative attitudes compared to men (see Table 1), while one study (Dowling et al., 2020) reported the opposite, and two studies (Ayandele et al., 2021; Åndra et al., 2021) did not find a statistically significant gender difference. Of the ten studies that investigated the relationship between gambling attitudes and age, five studies (Ayandele et al., 2021; Fiedor et al., 2018; Orford et al., 2009, 2010; Salonen et al., 2014; Sanscartier et al., 2019) reported an inverse association between age and positive attitudes. However, two studies (Pallesen et al., 2016, 2020) reported a positive association between age and positive attitudes, and three studies (Donaldson et al., 2015; Gavriel-Fried, 2015; McAllister, 2013) did not report a statistically significant association between gambling attitudes and age. Eight studies investigated education in relation to gambling attitudes. Four studies (Donaldson et al., 2015; Orford et al., 2009, 2010; Pallesen et al., 2020; Åndra et al., 2021) reported an inverse association between levels of education and attitudes, while one study (Salonen et al., 2014) reported a positive association between the ATGS and having 12 or more (in contrast to having less than 12) years of education. The remaining three studies (Fiedor et al., 2018; Gavriel-Fried, 2015; McAllister, 2013) did not find statistically significant associations between gambling attitudes and education level.

Risk of bias

The risk of bias assessment using the MMAT is summarized in Table 2. Three of the five categories in MMAT (qualitative, quantitative *non*-randomized controlled trials, and mixed methods) were not used in the assessment as none of the included studies in the present review were based on such designs. Four manuscripts were included in category two (quantitative randomized controlled trials) and the remaining 22 were included in category four (quantitative descriptive studies; see Table 2). Only five of the 26 manuscripts scored yes on all the categories in MMAT. Eight of the quantitative descriptive studies did not have a representative sample and two did not provide sufficient information to evaluate the representativeness (see Table 2). The risk of nonresponse bias was evaluated as high for three manuscripts and as unclear for nine manuscripts (see Table 2). All four experimental/intervention studies collected outcome data using self-report. Therefore, the outcome assessors could not be blinded to the experimental condition. Additionally, one study (Kaakinen et al., 2019) did not provide sufficient data to assess whether the randomization was performed appropriately or if the participants adhered to the assigned intervention.

Table 2. Results from the MMAT quality assessment.

Study	S1. Are there clear research questions?	S2. Do the data allow to address the research questions?	2.1. Is randomization appropriately performed?	2.2. Are the groups comparable at baseline?	2.3. Are there complete outcome data?	2.4. Are outcome assessors blinded to the intervention provided?	2.5. Did the participants adhere to the assigned intervention?	4.1. Is the sampling strategy relevant to address the research question?	4.2. Is the sample representative of the target population?	4.3. Are the measurements appropriate?	4.4. Is the risk of nonresponse bias low?	4.5. Is the statistical analysis appropriate to answer the research question?
Àndra et al. (2021)	Y	Y						Y	N	Y	C	C
Ayandele's et al. (2021)	Y	Y						Y	N	Y	C	C
Calado et al. (2017)	Y	Y						Y	N	Y	C	C
Calado et al. (2019)	Y	Y	Y	Y	Y	C	Y					
Canale et al. (2016)	Y	Y						Y	Y	Y	Y	Y
Delfabbro et al. (2021)	Y	N						N	N	Y	N	Y
Delfabbro et al. (2021)	Y	Y						Y	N	Y	C	C
Donaldson et al. (2015)	Y	Y						Y	C	Y	C	C
Dowling et al. (2020)	Y	C						C	C	Y	C	Y

(Continued)



Table 2. (Continued).

Study	S1. Are there clear research questions?	S2. Do the data allow to address the research questions?	2.1. Is randomization appropriately performed?	2.2. Are the groups comparable at baseline?	2.3. Are there complete outcome data?	2.4. Are outcome assessors blinded to the intervention provided?	2.5. Did the participants adhere to the assigned intervention?	4.1. Is the sampling strategy relevant to address the research question?	4.2. Is the sample representative of the target population?	4.3. Are the measurements appropriate?	4.4. Is the risk of nonresponse bias low?	4.5. Is the statistical analysis appropriate to answer the research question?
Fiedor et al. (2018)	Y	Y						Y	N	Y	Y	Y
Fiedor and Seidlova (2021)	Y	Y						Y	N	Y	C	C
Gavriel-Fried (2015)	Y	Y						Y	Y	Y	Y	C
Hanss et al. (2014)	Y	Y						Y	Y	Y	N	Y
Hanss et al. (2014)	Y	Y						Y	Y	Y	Y	Y
Kaakinen et al. (2019)	Y	Y	C	Y	Y	C	C					
McAllister (2013)	Y	Y						Y	Y	Y	N	Y
Oksanen et al. (2019)	Y	Y						Y	Y	Y	Y	Y
Orford et al. (2009)	Y	Y						Y	Y	C	Y	C
Orford et al. (2010)	Y	Y						Y	Y	Y	Y	Y

(Continued)

Table 2. (Continued).

Study	S1. Are there clear research questions?	S2. Do the collected data allow to address the research questions?	2.1. Is randomization appropriately performed?	2.2. Are the groups comparable at baseline?	2.3. Are there complete outcome data?	2.4. Are outcome assessors blinded to the intervention provided?	2.5. Did the participants adhere to the assigned intervention?	4.1. Is the sampling strategy relevant to address the research question?	4.2. Is the sample representative of the target population?	4.3. Are the measurements appropriate?	4.4. Is the risk of nonresponse bias low?	4.5. Is the statistical analysis appropriate to answer the research question?
Pallesen et al. (2016)	Y	Y						Y	Y	Y	C	Y
Pallesen's et al. (2020)	N	C						Y	Y	Y	Y	Y
Rosen et al. (2020)	Y	Y	Y	Y	Y	C	Y					
Salonen et al. (2014)	Y	Y						Y	Y	Y	Y	Y
Salonen et al. (2017)	Y	Y						Y	Y	Y	Y	Y
Sanscartier et al. (2019)	Y	Y						Y	N	Y	C	Y
Zhou et al. (2018)	Y	Y	Y	Y	Y	C	Y					

Y = Yes, N = No, C = Can't tell.

Discussion

The aim of this systematic literature review was to investigate the characteristics and synthesize the main findings of studies investigating attitudes toward gambling using the ATGS. A total of 23 unique studies, including 55,795 participants from 12 different countries were included for review. The current synthesis shows a clear general disapproval of gambling, which is consistent with research where other instruments than the ATGS have been used (Delfabbro & King, 2020; Smith et al., 2011). Although the tendency for negative attitudes is apparent, several of the included studies that used the ATGS-8 reported mean scores between 17–24, and 32–39 for all studies using the ATGS-14. Given that the mean score indicative of neutral attitudes is 24 and 42 for the two versions, respectively (Wardle et al., 2007, 2010), this suggests that the overall attitudes are rather mildly inclined towards being negative.

Against the other studies, two of the included studies (Ayandele et al., 2021; Dowling et al., 2020) reported positive attitudes just above neutral. This discrepancy from the majority of included studies is most likely related to sampling strategy. Both Ayandele et al. (2021) and Dowling et al. (2020) employed convenience sampling which could result in a sample with similar demographic variables and attitudes (Biernacki & Waldorf, 1981), as well as attract participants that are generally more interested in gambling. Further, a large percentage of the participants were male in Ayandele's et al. (2021) study (83.8%), and the overall mean age was relatively low in both samples (22.8 and 23.2 in Ayandele et al., 2021; Dowling et al., 2020, respectively). Additionally, Dowling et al. (2020) reported that 75% of the participants had participated in a gambling activity during the past year. Hence, the combination of sampling technique and sample characteristics (i.e. gender, age, gambling frequency) could explain why the respondents in these two studies reported more positive attitudes than the majority of the other included studies. However, as Ayandele's et al. (2021) sample comprised one of three samples not deriving from Europe or Australia, one cannot dismiss cultural factors or differences in national gambling policies influencing the results. Specifically, distinct cultural values and beliefs may have an impact on whether involvement in gambling is encouraged or discouraged (Raylu & Oei, 2004). In this vein, research has suggested that gambling is more common in more individualistic cultures as opposed to more collectivistic-oriented cultures (Ozorio et al., 2010). This could be related to cultural variations in risk-taking behavior more generally, where individualistic cultures to a larger extent than collectivistic cultures encourage individuals to take risks for personal reward – including risk-taking activities such as gambling (Ozorio et al., 2010; Raylu & Oei, 2004). Further, expansion of gambling opportunities could conceivably either increase positive or negative attitudes toward gambling. Liberalization of gambling could normalize gambling and thus lead to more positive attitudes, but increased expansion might also lead to experiences of oversaturation, i.e. people are fed up and grow distasteful towards gambling in general. The latter has been observed in association with gambling advertising among Australians (Thomas et al., 2012). However, although the observed between-study variance in ATGS scores in the current synthesis is probably to some extent attributable to cultural differences and distinctive national gambling policies, drawing conclusions on the magnitude of their impact on the current synthesis remains somewhat speculative due to methodological inconsistencies.

A consistent finding in this review was that gambling attitudes were positively associated with gambling frequency, suggesting that individuals who participate more in gambling also report more positive attitudes toward gambling. This is consistent with most studies on attitudes towards gambling using other instruments than the ATGS (e.g. Chiu & Storm, 2009; Delfabbro & Thrupp, 2003; Hardoon & Derevensky, 2002; Williams et al., 2006; Wood & Griffiths, 2004). However, since none of the included studies reported longitudinal data on this association, it is impossible to draw any conclusions about directionality and/or causality. The evidence regarding the relationship between problem gambling severity and gambling attitudes was somewhat conflicting in the studies included in the present synthesis. Considering the association between gambling frequency and gambling attitudes, it would be conceivable to expect that problem gambling severity would be associated with more positive attitudes as noted by four included studies (Donaldson et al., 2015; Gavriel-Fried, 2015; Hanss et al., 2014, 2014; Salonen et al., 2014), seeing as those who struggle with gambling are likely to have a high gambling frequency (Holtgraves, 2009; Pallesen et al., 2020). The positive association could also be related to gambling motives, as problem gamblers are more likely to gamble to cope with negative emotions or experiences, to socialize, as well as use gambling as a way to fix financial issues compared to non-problem gamblers (Stewart & Zack, 2008; Tabri et al., 2022). However, many problem gamblers experience several negative consequences related to their excessive gambling, such as financial problems, job loss, relationship problems, and psychological harms (e.g. depression and anxiety; Potenza et al., 2019). This could explain why four other studies (Donaldson et al., 2015; Gavriel-Fried, 2015; Hanss et al., 2014, 2014; Salonen et al., 2014), found an inverse relationship, suggesting that higher levels of problem gambling severity and associated consequences could lead to more negative gambling attitudes. Correspondent with Pallesen's et al. (2020) findings that problem gamblers reported less positive attitudes towards gambling than low-risk and moderate risk gamblers, it is possible that the gambler remains positive towards gambling until the point where the gambling-related problems become apparent or difficult to manage. Hence, the inconsistency regarding findings on the association between problem gambling severity and attitudes towards gambling in this synthesis could be related to differences in the severity of gambling problems in the different samples. Additionally, problem gamblers could possibly have different attitudes towards gambling depending on what stage of change they are at. In line with the stages of change model (Prochaska & DiClemente, 1983, 1992), problem gamblers may experience negative consequences while being unaware/avoiding that they themselves have a problem (Petry, 2005). It is conceivable that this also affects their attitudes towards gambling in general.

A further general finding was that males reported having more positive attitudes than women. This finding is also in line with former research using other instruments than the ATGS (e.g. Buczkiewicz et al., 2007; Jackson et al., 2008; Kassinove, 1998; Moore & Ohtsuka, 1997; Peltzer & Thole, 2000; Smith et al., 2011; Taormina, 2009; Wood & Griffiths, 1998). This could partly be explained by the fact that gambling is more common among men than women (e.g. Abbott et al., 2014; Wardle et al., 2010), thus again highlighting the relationship between gambling attitudes and gambling frequency. The gender difference in gambling engagement could be related to the fact that men are generally more impulsive and take more risks than women, which is supported by

research that has shown impulsivity and risk-taking to mediate gender differences in gambling engagement (Wong et al., 2013). The majority of studies that investigated the relationship between gambling attitudes and age found an inverse relationship between positive attitudes and increasing age (Ayandele et al., 2021; Fiedor et al., 2018; Orford et al., 2009, 2010; Salonen et al., 2014; Sanscartier et al., 2019). This might reflect that younger people do not have the same financial responsibilities that older adults have, such as a house, mortgage, or a family dependent on their income. Thus, losing money could have fewer consequences for younger individuals, and consequently, younger individuals might perceive gambling as less risky than older adults. This is also correspondent with the notion that younger individuals are generally more willing to take risks than older adults (Duell et al., 2018), which could render them more susceptible to gambling and could in turn result in more positive gambling attitudes. Education was only investigated in a few studies, of which four studies out of the five studies that found a statistically significant relationship indicated that educational level was inversely associated with gambling attitudes. A possible explanation could be that people with higher education might have a more conscious relationship with money. Alternatively, one might hypothesize that higher educated people are more aware of thought errors and superstitions related to gambling (Pallesen et al., 2020).

Limitations of the included studies

The current evidence base on the ATGS is somewhat limited as none of the survey-based studies included in this review, except for Pallesen et al. (2016), employed a longitudinal design. Consequently, no inferences can be drawn concerning directionality and causality on the relationships identified in this review. Further, nine of 23 studies recruited participants using convenience sampling which could result in a sample with similar demographic variables and attitudes (Biernacki & Waldorf, 1981), as well as attracting participants that are generally more interested in or have more positive (or negative) attitudes toward gambling, thus possibly skewing the results and limiting the representativeness of these samples. Another limitation is that all studies collected their data by self-report measures. There are several known biases related to self-report, such as recall bias and social desirability (Spencer et al., 2017; van de Mortel, 2008). Followingly, self-report measures could lead to inaccurate reports of gambling behavior and/or other covariates due to recall bias or participants adjusting their responses to what they perceive as more socially acceptable. Moreover, many studies used relatively young samples with respondents between 17 and 25 years of age (see Table 1). Consistent with the findings in this synthesis, a large proportion of young participants could lead the reports on gambling attitudes to be somewhat skewed towards the positive end. Further, with exception of one sample from Nigeria (Ayandele et al., 2021) and one sample and one subsample from Israel (Delfabbro et al., 2021, 2021; Gavriel-Fried, 2015), all the samples derived from Europe, Australia, or the USA, suggesting that the current results might not be generalizable beyond individuals from these countries. Lastly, the results from the risk of bias assessment showed that very few of the studies endorsed the maximum score in all categories of the MMAT (see Table 2). This suggests that there seems to be room for improvement in terms of study quality as well as sufficient reporting in studies employing the ATGS.

Limitations and strengths of the current review

The principal limitation of this synthesis is that the ATGS was employed in several quite specific populations (e.g. students, ex-offenders, young adults) in addition to more representative samples. This causes some challenges in terms of comparability as there can be different predictors related to scores on the ATGS for e.g. adolescents and older adults.

Further, when processing the findings, we extracted only estimates deriving from multivariate analyses rather than bivariate analyses if both adjusted and unadjusted estimates were reported in the manuscript. This means that we refrained to report significant associations that were found in the bivariate analyses, but that were not upheld in the multivariate analyses. Another limitation is that we did not perform language-specific literature searches for all European languages, and thus only manuscripts that were written- or included a title, abstract, and/or keywords in English would have been detected by the search strategy. As a consequence of this, and the fact that we excluded manuscripts not written in a European language, there is a risk that the current synthesis might to some degree be influenced by a language bias. A strength of this systematic literature review is the utilization of a relatively broad search syntax which reduces the risk that relevant manuscripts would not be identified by the literature search. Further, two reviewers conducted the screening, selection, and data extraction independently, which strengthens the reliability and internal validity of the synthesis.

Implications for future research, practice, and policy

The findings in this review suggest several future research avenues for research on gambling attitudes using the ATGS. Future studies should aim to explore the cross-cultural diversity of gambling attitudes, as well as investigate to a greater extent how the ATGS performs in non-western populations. Further, it would be interesting to investigate how different definitions of gambling are related to gambling attitudes, such as Fiedor et al. (2018) did in their study. When the definition of gambling varies between studies, there is a risk of measuring attitudes toward different conceptualizations of gambling. As reported by Fiedor et al. (2018), people who e.g. do not consider lottery tickets or raffles as gambling, may have different attitudes than those who do. As almost all the studies included in this review were cross-sectional, the evidence base would advance by future studies employing longitudinal designs. In addition to allowing for inferences on directionality, longitudinal data could allow for some clarification regarding e.g. the role of age in gambling attitudes: Are the positive attitudes found in younger people due to a generational change, or do they reflect a natural development in attitudes as one matures? Further, all studies employed self-reports to measure gambling participation/frequency and symptoms of problem gambling. Future research would benefit from combining more objective measures of gambling behavior (e.g. player tracking data and clinical assessment) with self-report measures of attitudes towards gambling to reduce the influence of bias associated with self-reported gambling behavior, and to investigate the relationship between attitudes and real gambling behavior. Importantly, problem gamblers are not a homogeneous group in terms of severity. Investigating nuances in problem gambling severity among problem gamblers (i.e. severity among

individuals who score above the conventional cutoff scores indicating problem gambling, e.g. PGSI = 8+), including clinical samples, could shed light on the divergent findings on problem gambling severity and gambling attitudes reported in the present synthesis. The ATGS only measures explicit attitudes. However, there are cases where explicit attitudes are not consistent with implicit attitudes, for example when there are social or cultural values associated with the attitudes (Rydell et al., 2006). Therefore, people who report negative explicit attitudes could have positive implicit attitudes or vice versa. Thus, future research would benefit to also include measures of implicit attitudes (e.g. by the implicit association test; Greenwald et al., 1998), to assess if there is congruence between implicit and explicit attitudes towards gambling. Lastly, as the gambling industry has increasingly started to offer gambling activities online in the last decade, it would be interesting to investigate whether there are different attitudes prevailing towards online gambling compared to more traditional land-based gambling.

Finally, the current findings also have relevance for gambling practice and policy. The fact that overall attitudes toward gambling were skewed to the negative side would suggest that most people would generally exhibit an inherent skepticism concerning the expansion of new gambling opportunities. Further, a general disapproval of gambling would conceivably also suggest that the public will generally accept more strict regulations regarding the gambling market, such as banning/removal of youth-targeted gambling advertisements (Kristiansen & Severin-Nielsen, 2022) and enforcing mandatory responsible gambling tools (e.g. spending-/loss limits or time breaks; Auer et al., 2020). Such mandatory measures in conjunction with voluntarily applied responsible gambling tools (e.g. self-exclusion, voluntary loss limits, self-testing for gambling problems, etc.) have been found to be important and effective in reducing gambling-related harm and are also generally perceived as useful by gamblers (Engebø et al., 2019; Gainsbury et al., 2013; Tanner et al., 2017).

Conclusion

The current literature review contributes to the field of attitudes toward gambling by being the first study to consolidate the evidence on studies using the ATGS. Most studies reported an overall tendency towards negative gambling attitudes. Men consistently reported more positive attitudes than women, younger people reported generally more positive attitudes than older people, and individuals with higher education seem to report more negative attitudes towards gambling than individuals with lower education. Higher gambling frequency was consistently shown to be associated with positive gambling attitudes, but the evidence on the association between problem gambling severity and attitudes towards gambling is currently divergent and in need of future clarification. The current evidence base is somewhat encumbered by limitations in study quality and designs, which highlights the need to employ the ATGS in more representative- and cross-cultural samples as well as employment of longitudinal investigations.

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Ethical approval

This paper presents a systematic review based on previously published data.

Preregistration statement

<https://www.crd.york.ac.uk/PROSPERO/>; record ID: CRD42022311675

Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

Open Scholarship



This article has earned the Center for Open Science badge for Preregistered. The materials are openly accessible at https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022311675

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