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Karolinska Institutet, Stockholm, Sweden

INVOLVING CONCERNED SIGNIFICANT OTHERS IN THE TREATMENT OF PROBLEM GAMBLING

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Stockholm 2019

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Published by Karolinska Institutet.
Printed by Universitetsservice AB

ISBN 978-91-7831-590-1

Involving Concerned Significant Others in the Treatment of Problem Gambling

THESIS FOR DOCTORAL DEGREE (Ph.D.)

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Everything is interesting.

ABSTRACT

Background: Problem gambling (PG) is a worldwide phenomenon that affects both gamblers and their concerned significant others (CSOs). Apart from financial difficulties, problem gambling is associated with disrupted relationships, poor mental and physical health, and in some cases criminality. Treatments with cognitive behavioral therapy have generally been efficacious in treating problem gambling, but studies have generally had low adherence to treatment, and few problem gamblers seek treatment. Previous research suggests that involving CSOs can increase treatment seeking, adherence to treatment and improve outcomes for the problem gambler, as well as being beneficial for the CSO.

This thesis covers five papers on PG treatment and CSO involvement in PG treatment. Four of the papers build on data from *Gambling Free Together* (Spelfrihet Tillsammans), an Internet-based randomized controlled study on the involvement of CSOs in PG treatment. The fifth paper covers the results from the *Concerned Significant Other Study* (Anhörigstudien), an Internet-based randomized controlled trial investigating a support program for CSOs of problem gamblers.

Aim: The aim of the present thesis is to study the outcome of Internet-based interventions for problem gamblers and CSOs, the effect of involving CSOs in PG treatment, reasons for drop-out, and the concordance of gambling measures between gamblers and CSOs.

Methods: Study I was a parallel-group randomized controlled (RCT) feasibility and pilot trial (N=36, 18 gamblers and 18 CSOs) with 6-month follow up. It primarily investigated the feasibility of the protocol, with the intent of later performing a full scale RCT with the same design. The participants were randomized to either the Cognitive Behavioral Treatment (CBT) condition where only the gambler received treatment, or the condition inspired by Behavioral Couples Therapy (BCT) where both the gambler and the CSO received treatment modules. Participants received 10 treatment modules and weekly telephone support from a therapist. Study II investigated the level of agreement, using intraclass correlation coefficients, between the participating gambler and the respective CSO regarding money lost to gambling, gambling debt and years spent gambling with data from participants in Study I and IV (N=266, 133 gamblers and 133 CSOs). It also included a small simulation study on which assumptions to make regarding distribution of data. Study III was a parallel-group RCT of a support program for CSOs of problem gamblers (N=100), with 12-month follow up. The intervention group received nine treatment modules inspired by Community Reinforcement and Family Training (CRAFT) and weekly telephone support from a

therapist, while the other group was put on a waiting-list. Study IV was a parallel-group RCT (that built on the pilot study described above as Study I) investigating the effects of CSO involvement in PG treatment, where participants (N=272, 136 gamblers and 136 CSOs) received 10 treatment modules and weekly telephone support by a therapist. The participants were randomized to either the Cognitive Behavioral Treatment (CBT) condition where only the gambler received treatment modules, or the condition inspired by Behavioral Couples Therapy (BCT) where both the gambler and the CSO received treatment modules. The participants were monitored up to 12 months post-treatment. Study V was a qualitative study on reasons for drop-out from PG interventions. The participants (N=16; 8 gamblers and 8 CSOs) had either dropped out, or were CSOs of gamblers that had dropped out, from Study IV. They were interviewed regarding reasons for drop-out, the process of help-seeking and their views on PG treatment.

Results: The results from Study I were inconclusive regarding the relative treatment effect between BCT and CBT gamblers, but both groups significantly improved on all outcomes. BCT was superior than CBT for the CSOs. Feedback from therapists and participants led to some changes to routines and guidelines, but not in treatment content. Results from Study II indicated that CSOs and gamblers had a fair agreement on money lost to gambling, where partner CSOs had a slightly better agreement than other types of CSOs. The simulation study revealed that using a normal distribution when studying money lost might produce unreliable results. Study III showed that CSOs improved on all outcomes related to mental health and relationship satisfaction, but the gamblers' gambling seemed unaffected. Study IV showed inconclusive results regarding the involvement of CSOs in treatment, but both groups improved on all outcomes. Study V showed that a broad spectrum of themes was related to drop-out, such as changing life circumstances, relapses, and emotional problems, but also a sense of recovery, making treatment seem unnecessary.

Conclusions: Supporting CSOs of problem gamblers seem to lower symptoms of psychiatric distress in CSOs, but it is unclear if it has any effect on the gambling of the problem gambler. Involving CSOs in PG treatment might increase the willingness to commence treatment for problem gamblers, but the effects on treatment outcome, and adherence to treatment for the gambler are inconclusive. CSOs seem to have a fair insight into the gambling of the problem gambler, but such insight might vary as a function of the type of relationship. Gamblers dropped out of treatment for various reasons, both because of lack of treatment results but also because they no longer experienced a need for treatment.

LIST OF SCIENTIFIC PAPERS

I. Nilsson, A., Magnusson, K., Carlbring, P., Andersson, G., & Gumpert, C. H. (2018). The development of an Internet-based treatment for problem gamblers and concerned significant others: A pilot randomized controlled trial. *Journal of gambling studies, 34*(2), 539-559.

II. Magnusson, K., Nilsson, A., Andersson, G., Hellner, C., & Carlbring, P. (2019). Level of Agreement Between Problem Gamblers' and Collaterals' Reports: A Bayesian Random-Effects Two-Part Model. *Journal of gambling studies, 1-19*.

III. Magnusson, K., Nilsson, A., Andersson, G., Hellner, C., & Carlbring, P. (2019). Internet-delivered cognitive-behavioral therapy for significant others of treatment-refusing problem gamblers: A randomized wait-list controlled trial. *Journal of consulting and clinical psychology*, *87*(9), 802.

IV. Nilsson, A., Magnusson, K., Carlbring, P., Andersson, G., & Hellner, C. (2019). Behavioral Couples Therapy vs Cognitive Behavioral Therapy for Problem Gambling: a Randomized Controlled Trial. Submitted and re-submitted to Addiction.

V. Nilsson, A., Simonsson, O., & Hellner, C. (2019). Reasons for Dropping out of Treatment, Preferred Treatment, and the Process to Get There: a Qualitative Assessment. Manuscript.

CONTENTS

LIST OF ABBREVIATIONS

AUDIT	The Alcohol Use Disorders Identification Test
BCT	Behavioral Couples Therapy
CBT	Cognitive Behavioral Therapy
CRAFT	Community Reinforcement and Family Training
CSO	Concerned Significant Other
GAD-7	Generalized Anxiety Disorder 7-item Scale
RCT	Randomized Controlled Trial
GLMM	Generalized Linear Mixed-Effects Model
ICBT	Internet-Based Cognitive Behavioral Therapy
ICC	Intraclass Correlation Coefficients
ICS	Inventory of Consequences for Scale for the Gambler and CSO
LMM	Linear Mixed-Effect Model
MAR	Missing at Random
PGSI	Problem Gambling Severity Index
TLFB-G	Time-Line Follow-Back for Gambling
NODS	The National Opinion Research Center Screen for Gambling Problems
PHQ-9	The Patient Health Questionnaire-9
RAS-G	Relationship Assessment Scale Generic
SOGS-R	South Oaks Gambling Screen Revised
WHOQOL-BREF	World Health Organization's Quality of Life Assessment

1 INTRODUCTION

Approximately 2.3% of the world adult population is considered to be problem gamblers (1). Similar figures apply for the Swedish context (2), and another 18% are considered to be a concerned significant other (CSO) of someone who is or has been a problem gambler (3).

My first encounter with problem gambling (PG) was purely professional, as I worked as a counselor at the Swedish National Helpline for Gamblers and CSOs. What was then seen as a peripheral condition affecting a relatively small portion of society has since become an intensely debated subject within large parts of the Swedish society: in relation to the responsibilities of the health care system, the legality of offshore gambling corporations, the government's revenues from gambling, and the near omnipresent gambling advertising.

From a psychological point of view it is obvious that PG touches some very core aspects of human behavior, as a model of how reinforcement and cognitive distortion can keep people on a thoroughly destructive path in life. As a clinician, the sometimes heart-wrenching stories of lifelong debt, suicide and shattered families were punctuated by narratives of resurrection, self-sacrifice and hope despite a seemingly bleak future. It also became obvious that there was one group whose needs as well as competence was not properly taken care of: the families and friends of problem gamblers. They were often the ones who were hurt the worst, financially as well as psychologically, and they were also key persons in the process of recovery. PG clients often spontaneously exclaimed that "I wish my wife would hear this" or "I need to involve my parents in this" in response to themes brought up in treatment. Still, CSOs were largely ignored in the clinics as well as in the research literature.

From that perspective, it seemed reasonable to somehow investigate the role CSOs can play in the treatment of PG, together with the aim of improving treatments for PG. This thesis is the results of the efforts that I, together with my colleagues, supervisors and collaborators, have made to widen the knowledge of how to support problem gamblers and their CSOs. The studies have both merits and limitations, and we have long way to go before our interventions can be said to be truly evidence-based. I hope this thesis will be one step in that direction.

1.1 DEFINITIONS

Various terms are used to describe the state related to when an individual fails to control one's gambling, despite significant negative financial, social and personal consequences. The diagnostic term in the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (DSM-5) as well as in *International Classification of Diseases, 11th Revision* (ICD-11) is

gambling disorder (GD), with overlapping but not identical diagnostic criteria, see Figure 1. These replace the previous terms *pathological gambling* in DSM-IV and *gambling addiction* in ICD-10. There are also several other terms in the research literature, such as *compulsive gambling* and *gambling problems*, connoting similar and partly overlapping concepts, but these are not mentioned in ICD-11 or DSM-5. In DSM-5, GD is divided into three levels of severity based on the number of criteria met; 4-5 means is categorized as mild GD, 6-7 as moderate GD and 8-9 as severe GD.

Some researchers have raised concerns that the threshold for obtaining a GD diagnosis may be too high. A study of 600 students showed that those fulfilling 2-3 diagnostic criteria were identical with those who fulfilled 4-8 criteria in terms of comorbidity and neurocognitive functioning (4). Instead the two groups differed substantially from the third group: those with no gambling-related problems. Other authors have pointed out that substance use disorders in DSM-5 require only 2 out of 11 criteria to fulfil a diagnosis, and that sub-clinical gamblers display the same level of impairment as those who fulfil 2-3 substance use criteria (5).

Problem gambling (PG) is frequently used in prevalence and clinical studies to describe a less severe form of problematic gambling, alternatively as an all-embracing term connoting both gambling disorder and conditions that do not fulfil this diagnosis but is still associated with substantial negative effects. The term PG will henceforth be used in the latter sense. A commonly used definition of PG was proposed by Neal et al. (2005): "Problem gambling is characterized by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community." (6).

Table 1: DSM-5 and ICD-11 criteria for Gambling Disorder.

DSM-5:

A. Persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period:

1. Needs to gamble with increasing amounts of money in order to achieve the desired excitement.
2. Is restless or irritable when attempting to cut down or stop gambling.
3. Has made repeated unsuccessful efforts to control, cut back, or stop gambling.
4. Is often preoccupied with gambling (e.g., having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking

of ways to get money with which to gamble).

5. Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed).
6. After losing money gambling, often returns another day to get even ("chasing" one's losses).
7. Lies to conceal the extent of involvement with gambling.
8. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling.
9. Relies on others to provide money to relieve desperate financial situations caused by gambling.

B. The gambling behavior is not better explained by a manic episode.

ICD-11:

A. Description

Gambling disorder is characterized by a pattern of persistent or recurrent gambling behavior, which may be online (i.e., over the internet) or offline, manifested by:

1. impaired control over gambling (e.g., onset, frequency, intensity, duration, termination, context);
2. increasing priority given to gambling to the extent that gambling takes precedence over other life interests and daily activities; and
3. continuation or escalation of gambling despite the occurrence of negative consequences. The behavior pattern is of sufficient severity to result in significant impairment in personal, family, social, educational, occupational or other important areas of functioning. The pattern of gambling behavior may be continuous or episodic and recurrent. The gambling behavior and other features are normally evident over a period of at least 12 months in order for a diagnosis to be assigned, although the required duration may be shortened if all diagnostic requirements are met and symptoms are severe.

B. Inclusions

Compulsive gambling

C. Exclusions

Bipolar type I disorder

Bipolar type II disorder

Hazardous gambling or betting

1.2 A BRIEF HISTORY OF GAMBLING AND PG

While there has been a recent surge in interest regarding PG, the phenomenon is far from new. Archeological findings indicate that gambling has been present in Sweden at least since the Iron Age (7). With gambling generally comes some type of gambling problems. Records from the Roman empire talks about rampant gambling, that led to the introduction of gambling restricting laws; gambling was forbidden altogether during parts of the Ming dynasty, and King Richard III forbade it during the crusades (8). Over the centuries, there seem to have existed a general awareness of the risks of excessive gambling, manifested in expressions like *spielteufel* in German and *demon du jeu* in French, government regulations and religious restrictions, such as the outright gambling ban outlined in the Quran.

While there has been a clear sense of gambling as a potentially harmful activity, the existence of a psychiatric diagnosis related to gambling is a modern phenomenon. A common interpretation of problem gambling has been to see it as a moral flaw within the individual. However, the first half of the 20th century saw a gradual change in the perception of problem gambling. To name a few theorists investigating problem gambling, behaviorism's father figure B.F. Skinner identified gambling as a particularly addictive activity (9), and the psychoanalyst Edmund Bergler characterized the chronic gambler as driven by unconscious desires to be punished and to control his or her fate (10).

In 1980, the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) was published, and pathological gambling was included as one of the diagnoses, classified as an impulse control disorder. In subsequent editions of DSM, the diagnostic criteria have changed slightly and as of DSM-5, published in 2013, the clinical term is gambling disorder (GD), and it is since classified as an addictive disorder (11). The main change in DSM-5 was the altered name, the change from the "*Impulse-Control Disorders Not Elsewhere Classified*" section to the "*Substance-Related and Addictive Disorders*", as well as the removal of one criterion; illegal acts to support gambling. This represents an important shift in the view on PG in categorizing it as a diagnosis similar to substance use disorders. GD now contains nine diagnostic criteria and is indicated if a person exhibits four or more criteria in a 12-month period, see Table 1. The criteria largely mirror those of other addictive disorders, such as preoccupation, failed attempts to quit or cut back, and a need to increase the amounts spent on gambling to achieve the desired excitement. But other criteria are more unique to GD, such as returning to gamble the day after losing money to gambling (chasing), and relying on others to relieve desperate financial situations caused by gambling.

1.3 GAMBLING AND PG IN SWEDEN

In the Swedish context, modern gambling could be said to have started with the preparations for the Stockholm World Fair in 1897, when the previous ban on gambling was lifted in order to arrange a lottery in support of the fair (12). This is hardly unique; various causes have been cited in order to justify gambling through history: the American acquisition of the state of Virginia, to support civil society, or to take control of an activity otherwise provided illegally (8). Gambling has often been viewed with suspicion from society, and governments have often looked for ways to restrict its spread or to control its revenues, or both. The Swedish gambling market has been no exception. From the beginning of the 1900-hundreds and onward, the Swedish gambling market gradually encompassed more and more complex games: horse track betting was introduced in 1923, sports betting in 1924, permanent nationwide lotteries in 1934, electronic gambling machines (EGMs) in 1996, and land-based casinos in 1999 (12).

With few exceptions during the 20th century, operating gambling in Sweden was reserved for non-commercial actors such as government owned corporations, sports associations, charity organizations and political parties. During the 21st century however, the Swedish gambling market has become increasingly commercial, and in 2017, the commercial actors' market share was 24% (13). This gambling is exclusively online-based, and online gambling platforms have made it possible for commercial gambling operators to provide gambling opportunities, despite being prohibited to do so by Swedish law. The private gambling operators have been based outside of Sweden, but have offered online gambling opportunities for Swedish gamblers. As of 1 January 2019, the Swedish gambling market was opened up to commercial operators. In theory, this would provide Swedish gambling customers novel gambling opportunities such as internet based casinos, but in reality, this has been available for several years already.

1.4 PREVALENCE OF PG

The first survey of the prevalence of PG in Sweden, SWEGS in 1998, revealed that 0.6% fulfilled the criteria for past year pathological gambling, and another 1.4% the criterion for PG (14). The SWELOGS study from 2008 revealed that 0.3% could be classified as past year pathological gamblers, and another 1.9% fulfilled the criteria for PG (15). In the SWELOGS study from 2016, 0.4% fulfilled the criteria for past year gambling disorder, and 1.3% the criteria for PG (2). The SWEGS study used South Oaks Gambling Screen Revised (SOGS-R) (16) to measure problem gambling, while the SWELOGS studies used the more conservative

estimate Problem Gambling Severity Index (PGSI) (17). During this time period, past year participation in gambling activities in the general population has decreased from 88% in 1999 to 72% in 2008 to 58% in 2016. Paradoxically, gambling participation has sunk at a time when the gambling market, in terms of turnover, has increased.

From an international perspective, the prevalence of problem gambling in Sweden is relatively average. The methods and instruments used to estimate the prevalence of PG vary across studies and countries. In an effort to standardize prevalence figures across the world, Williams et al. (1) found that the world prevalence was 2.3% compared to 1.5% in Sweden. In general terms, the highest prevalence figures were found in southeast Asia and the lowest prevalence in northern Europe.

Estimations of the number of CSOs affected by the negative sides of gambling vary, but one estimation is that 18% of the Swedish population is a CSO of someone who is or has been a problem gambler (18). This includes anyone who declares that they are or have been negatively affected by someone's gambling. This roughly corresponds to the estimation that on average six people are affected by one person's problem gambling (19), and to a Finnish study estimating that 20% of the population is a CSO of a problem gambler (20). However, some studies have a narrower definition, where only close family members are counted as CSOs, rendering a significantly lower percentage. In a Norwegian study, for example, the figure was merely 2% (21). Another measurement of the number of affected CSOs is the number of people cohabiting with a problem gambler. In Sweden, this number has been estimated to be 171,000 persons, which equals roughly 2% of the population (2).

2 HARMS AND COMORBIDITIES

PG generally creates severe financial, social and health-related harms (22). Gambling-related harm has been proposed by Langham et al. (2016) as "any initial or exacerbated adverse consequence due to an engagement with gambling that leads to a decrement to the health or well-being of an individual, family unit, community or population" (23). This means that gambling-related harm must be understood not just in relation to the gambler, but also to CSOs and the community as a whole. It should be noted however that the link between cause and effect for PG and proposed harms is sometimes ambiguous, meaning that a reverse relationship is also possible, where those at risk of health-related problems may be more vulnerable to developing PG.

2.1 HARMS FOR THE PROBLEM GAMBLER

Problem gamblers often face various negative social, financial, and health-related consequences caused by the gambling. The financial impact is perhaps the most straightforward, with many problem gamblers reporting severe economic deprivation, debts, and being heavily dependent on others to sustain a living (22). The scope of the economic difficulties range from complete financial ruin and being indebted for life to less serious consequences such as cancelled activities and purchases. In turn, financial difficulties are also related to other negative consequences such as committing illegal acts or being chased by creditors and debt collectors (24).

PG is also associated with severe psychological distress and to physical ill-health. Problem gamblers have up to ten times higher risk of having a diagnosis of substance abuse during their lifetime (1, 25-27). Problem gambling is associated with approximately three times as high risk for depression and anxiety as the general population (27, 28), and there is an increased risk for suicide attempts, suicide plans and suicide ideation among people with gambling disorder (29-32). Problem gambling is also associated with physical health problems (33, 34), an increased risk of perpetrating and being exposed to acts of violence (35, 36), and a lower socioeconomic status (37, 38).

2.2 COMORBIDITY AND CLINICAL CORRELATES

A problem gambler is typically a comorbid one. In a 2001-2002 American prevalence study with 43,000 participants, of those who fulfilled the DSM-IV criteria for pathological gambling 73% also fulfilled the criteria for an alcohol use disorder; 38.1% had a drug use disorder, 49.6% had a mood disorder, 41.3% had an anxiety disorder and 60.8% had a

personality disorder (39). Similar results have been found in the SWELOGS study (2, 40), as well as in the US National Comorbidity Survey, where 96.3% of pathological gamblers had a lifetime comorbidity with at least one psychiatric diagnosis (28). A meta-analysis of eleven population studies showed that problem- and pathological gamblers had a mean lifetime prevalence of nicotine dependence of 60.1%, substance use disorder of 57.5%, mood disorder 37.9% and anxiety disorder 37.4% (41).

2.3 HARMS FOR CSOS

The harms for CSOs of problem gamblers are relatively well-documented. Langham et al. (23) proposed a "taxonomy" of harms experienced by CSOs of problem gamblers, as well as the problem gamblers themselves. This classification covers harmful impacts on several different domains: financial, relationships, psychological health, work/study, culture, criminal activity and life course harms. The negative financial impacts range from occasionally lending money and paying for a disproportionate part of shared expenses to severe impacts such as being the victim of fraud, theft and embezzlement, or being evicted because of unpaid bills (42-44).

Problem gambling also tends to take its toll on the relationship between the gambler and CSOs. CSOs often report that the relationship to the gambler is severely strained (18, 22, 44), but also that relationships with other friends and family members become negatively affected (43, 45). Relationships with the gambler is often marred by suspicion and elevated levels of conflicts, and CSOs of problem gamblers are more likely to be victims of intimate partner violence (46).

CSOs also experience higher level of psychological distress compared to the general population. Depression, anxiety, drinking, panic attacks, excessive eating, and smoking are generally more frequent among CSOs of problem gamblers (18, 45, 47), as well as physical health issues such as bowel problems, insomnia and headaches (43, 47). Comparing harms for problem gamblers and for CSOs, problem gamblers tend to report more health-related problems, such as alcohol consumption and suicidality, while CSOs report more problems related to the relationship with the gambler (22).

3 ETIOLOGY

3.1 RISK FACTORS

A few attempts have been made to establish risk factors for PG (22, 23). Numerous factors are associated with PG, but only a handful have been established to be risk factors for PG, i.e. they are factors preceding the onset of the PG. Research on risk factors are dependent on long term follow-up studies, which come in short supply within the field of gambling studies, and naturally also of what factors have been investigated in each study.

The SWELOGS study identified four risk factors: alcohol- and drug problems, impulse control deficiencies, previous gambling problems and an insecure childhood, but several other factors associated with PG could be identified as risk factors in subsequent follow-up studies (22). A meta-analysis of risk factors in childhood, adolescence and young adulthood for developing PG later in life found that gambling severity, male gender and poor school performance were the strongest risk factors for PG (24), while another meta-analysis described at least six "well established risk factors": demographic variables (age, gender), cognitive distortions, sensory characteristics, schedules of reinforcement, comorbid disorders (OCD, drug abuse), and delinquency/illegal acts (23). This diversity suggests that the understanding of risk factors in PG, and how to measure it, is somewhat incoherent, and these risk factors are likely to be risk factors also for other negative mental health outcomes.

3.2 CULTURAL FACTORS

While PG is a worldwide phenomenon, the prevalence of PG varies. In general, prevalence of PG is highest in Southeast Asian countries, and lowest in Northern Europe, and in certain areas of the world, such as Africa, the Middle East, and South America, the prevalence of PG has not been studied in great detail (1). Some of the variations can likely be attributed to legislation and variations in data collection methods, but cultural practices and beliefs regarding luck, chance and numbers could have an effect on gambling behavior (25). Religion also plays an important role, where Islam has a particularly negative view on gambling compared to other world religions (26), which might affect people directly on an individual level, but also gambling policy in pre-dominantly Muslim countries (e.g. gambling is forbidden in countries such as Saudi Arabia, Iran, Algeria, and Indonesia). It is noteworthy that gambling does not seem to be omnipresent in human civilization. On the contrary, prior to European colonization, large parts of the world were inhabited by non-gambling societies (27). The social anthropologist Per Binde (27) suggests some prerequisites for gambling to

occur in a society: a) the presence of commercially used money, b) social inequality, c) societal complexity, d) the presence of "competitive inter-tribal relations", i.e. competitions and games that are important in maintaining and contesting relationships between tribes or groups in a society. Nevertheless, as of today gambling, and therefor PG, is present in virtually all parts of the world, even though its popularity differs between regions and countries.

3.3 ENVIRONMENTAL AND SOCIAL FACTORS

The prevalence of PG is unevenly distributed within the studied populations. Most strikingly, a vast majority of problem gamblers are male, and they tend to be of younger age (2, 28-31). People with an academic education seem to have lower levels of problem gambling compared to other groups (2, 30-32). In several studies, low income has been shown to be associated with problem gambling (2, 30, 31), but other studies have not found such an association (32, 33). In a survey of high school students in Stockholm, 21% of male students in certain socio-economically vulnerable areas reported having experienced negative effects of gambling, while the same number in more affluent areas was 2-3% (34). Exposure to gambling at a young age has been found to be associated to PG later in life (35), and childhood maltreatment has been found to correlate with PG in several studies (36, 37).

An ongoing discussion in the scientific community is how availability of gambling affects the share of problem gamblers in a population. There is a relative scientific consensus that increased availability such as more electronic gaming machines or new land-based casinos seem to increase the prevalence of PG (38, 39), but that the effects wane with time in a process referred to as adaptation. With online gambling, there are no physical restraints such as the geographical distribution of venues or opening hours on gambling; on the contrary gambling is becoming constantly available. How this will affect the prevalence of PG remains to be investigated (40).

3.4 GAME CHARACTERISTICS

Different types of games seem to have different addictive qualities. In general, fast games with high accessibility and the possibility to play continuously, such as electronic gaming machines and internet casinos, are considered more likely to cause harm than slower games such as lotteries or scratch lottery tickets (41, 42). Other game features, such as lights, sounds and size and number of wins also seem to affect the games' addictive qualities (43).

One particular aspect of gambling is the near-miss effect, which refers to the illusion that the gambler "almost wins", while in fact in he or she is losing (44). This could be when a chosen horse finishes second or when two (out of three) lemons are displayed on the slot machine payline. Frequent near-misses have been shown to effect gambling persistence (45, 46) and activate the same brain regions as actual wins (47), which could make the gambler interpret the gambling as more successful than it actually is. It should also be mentioned that features such as bonuses, free spins and gambling advertisements have been found to increase gambling consumption (48).

3.5 PSYCHOLOGICAL FACTORS

3.5.1 Cognitive distortions

Several types of potentially maladaptive thought patterns are associated with PG. A theoretical assumption is that fundamental parts of gambling – such as chance, probability, and unusually large numbers – produce cognitive distortions, miscalculations and errors of judgement to a larger extent than other situations (49). It is believed that cognitive distortions play an important role in the development and maintenance of PG (50). These cognitive distortions vary in content, but they generally foster an exaggerated confidence in one's chances of winning. Some examples of cognitive distortions are (51):

- Superstitious beliefs about objects, rituals and behaviors that will influence the chances of winning (e.g. a lucky ring, praying for a win or knocking the table before playing).
- Interpretative biases that overestimate one's gambling skills and underestimate the role of chance.
- Gambler's fallacy: that a win is bound to occur after several losses.
- Selective memory regarding the win-loss ratio.

3.5.2 Reinforcement

A core assumption in behavioral and cognitive-behavioral models of PG is that gambling is reinforced through negative and positive reinforcement, and that gambling is particularly strongly reinforced due to intermittent reinforcement schedules (52). The early behaviorist B.F. Skinner offered an explanation to continued gambling despite overwhelming losses by pointing to the variable-ratio schedule reinforcement of gambling (53). Skinner used pigeons pressing a lever to obtain food as an illustration of the processes in gambling; the pigeons were more likely to press the lever when the reinforcement was random than when it was on

a fixed interval. In a gambling context, the behavior is likely to be repeated, and reinforced, thousands of times for problem gamblers (54). The idea that the intermittent reinforcement plays a role in gambling has been confirmed in later experiments (55-57). It should also be noted that gambling is not just reinforced by providing arousal for the gambler when winning, but also by possibly alleviating the gambler from negative emotional states.

3.5.3 Biological explanations

In very general terms, two factors have been the main focal points of biological explanations for PG: the heritability of PG, and the role of the brain's reward system in PG. Studies on mono- and dizygotic twins reveal that monozygotic twins of a problem gambler have a higher risk of PG compared to dizygotic twin (58, 59), indicating genetic influences on PG. However, this genetic vulnerability might also be a vulnerability for problematic alcohol use (60). One suggestion is that impulsivity is an underlying risk factor for both conditions (61).

The reward system has been of particular interest in the study of substance use disorders. The reward system consists of several brain areas working together to regulate individuals' reactions toward or away from rewards, where the neurotransmitter dopamine plays a key role. There is however no consensus on exactly how the reward system works in PG, with some researchers pointing to a hyperactivity in the reward system and others pointing to a hypoactivity in the same system (61). Both scientific schools point to a hypersensitivity to gambling stimuli (62) and a decreased sensitivity to other types of stimuli (63). While PG has been assumed to share neurobiological features with alcohol- and substance use disorders, recent research instead point to important differences (61), where problem gamblers display a hypoactive reward system when receiving rewards whereas in substance use addiction this is not the case. Thus, more research is needed on the role of the reward system in PG, and neurobiological similarities and differences compared to alcohol- and substance use disorders.

3.6 COMPREHENSIVE THEORIES

3.6.1 Biopsychosocial model

The most integrative theory of PG is perhaps the biopsychosocial model of pathological gambling, that combines biological, psychological and social factors to explain PG (52, 64). The biopsychosocial model is based on cognitive-behavioral theories on the development and maintenance of PG, incorporating theories of operant and classical conditioning regarding reinforcement. The theory is similar to the diathesis-stress framework (65) common in other

fields of psychology, and states that predisposing factors such as genetic vulnerability interacts with gambling availability, gambling experiences such as early wins and negative psychological experiences such as boredom, trauma or anxiety. A relatively large focus is put on the cognitive factors maintaining PG, such as cognitive distortions regarding one's chances to win (e.g. feeling lucky, "knowing" when a win is due).

The biopsychosocial model has been incorporated in many CBT based treatment approaches to problem gambling, but has also been criticized for not fully taking into account the heterogeneity of PG, but rather assuming similar pathways for all problem gamblers (66). It should also be noted that the model is mostly based on research prior to 1990, and the research on PG since then might challenge some of the core assumptions of the model.

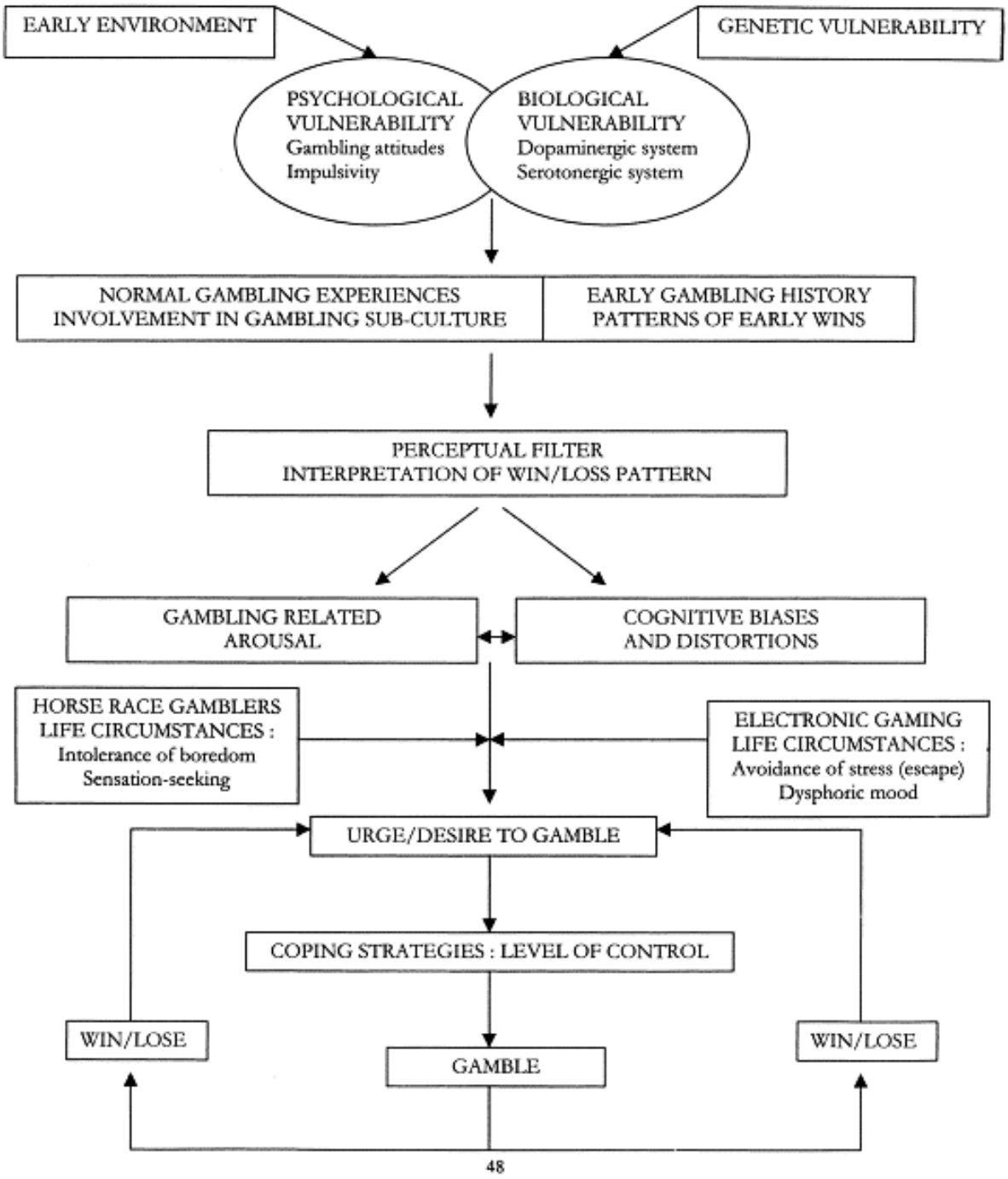

Figure 1: *Graphic depiction of the biopsychosocial model of pathological gambling. In:* Sharpe, L. (2002). A reformulated cognitive–behavioral model of problem gambling: A biopsychosocial perspective. *Clinical psychology review*, 22(1), 1-25. Reprinted with the permission of Elsevier.

3.6.2 Pathways model

The pathways model is a model that emphasizes the heterogeneous nature of PG and proposes that problem gamblers can be grouped into three different subgroups: the behaviorally conditioned problem gambler, the emotionally vulnerable problem gambler, and the antisocial-impulsivist problem gambler (66). The model takes into account various biological, social, and psychological factors and proposes three distinct pathways that

eventually lead to PG. The behaviorally conditioned gambler has an absence of comorbid conditions prior to the debut of PG, which separates it from the two other groups. Instead, principles of conditioning, cognitive distortions and bad decision-making has led to the development of problem gambling. Levels of depression, anxiety and alcohol may be elevated in this group, but as a consequence of excessive gambling rather than the cause. The emotionally vulnerable group is no different in terms of conditioning, cognitive distortions and bad decision-making, but in addition they also have premorbid anxiety and depression, negative family background experiences, and adverse life events. For this group, gambling is predominantly a negatively reinforced activity used to modulate affective psychological states. The antisocial-impulsivist group shares all the features of the first two groups, but is further distinguished by features of impulsivity and antisocial traits. This group is described as "highly disturbed individuals" who engage in a wide array of problem behaviors such as substance abuse, criminality, and suicidality that are not necessarily related to gambling. The pathways model has been influential within the field of gambling research, and a number of studies have examined the theory. The results have been mixed with some studies confirming the theory (67, 68), while others have found four (69) or five (70) pathways.

4 TREATMENTS

A large proportion of problem gamblers seem to recover without formal treatment (71, 72), while others seek the assistance of professionals. A number of meta-analyzes have investigated the effect of various psychological interventions for problem gambling (73-75). *Cognitive behavioral therapy* (CBT) is the intervention with the most robust research support, but the meta-analyses also point to a scarcity of well-designed RCTs, which makes it difficult to draw conclusions about the results. Most studies have not monitored participants for more than six months after the trial ended. The Cochrane collaboration found that *Motivational Interviewing* (MI) could also be beneficial for the treatment of PG (73), a finding that is not shared by the Swedish Agency for Health Technology Assessments and Assessments of Social Services, which concluded that MI does not have an impact on PG (74). It should be noted that most participants in control conditions in studies of PG also display a rapid and significant reduction in gambling. This makes it difficult to distinguish the effect of a certain intervention relative to common factors, such as the enrollment process, where all participants were interviewed by a therapist, and replied to the same measurements. Another complicating factor is the high attrition rates in studies of PG interventions (76).

Certain specific factors might be related to more successful treatment outcomes. A meta-analysis by Merkouris et al. (77) of 50 studies revealed that the most consistent predictors of a successful treatment outcomes were male gender and low levels of depression, and that older age, lower gambling symptom severity, less gambling and less alcohol consumption were likely predictors of successful treatment outcomes.

Apart from psychological interventions, various pharmacological treatments such as mood stabilizers, antidepressants and antipsychotics have also been tested for PG, with mostly limited success (78). Most trials have however focused on opioid antagonists, which has had some limited success in lowering symptoms of PG (78), but the trials have generally been small in numbers, and methodological flaws seem to cloud the value of the trials (79). One reason for the mixed results in pharmacological interventions for PG could be the heterogeneity of PG, where some sub-groups might benefit from mood stabilizers, some from opioid antagonist etc. (80).

4.1 COGNITIVE BEHAVIORAL TREATMENTS

CBT is an umbrella term for psychological therapies based on behavioral and cognitive principles, and is, as previously mentioned, the treatment approach with the most robust

scientific support (73). Cognitive interventions generally focus on the role of maladaptive thought patterns and memory biases related to gambling, such as overestimations of one's chances to win, and a tendency to remember wins more clearly than losses (81). Behavioral interventions explain PG as a learned disorder, where gambling is a reinforced behavior within a functional framework (antecedent, behaviors, and consequences). Behavioral treatments include working with exposure to high-risk situations, strategies to reduce avoidance and identifying specific triggers (81). CBT treatments generally combine both cognitive and behavioral principles.

Various types of CBT components have been studied in relation to PG, for example cognitive restructuring, exposure therapy, mindfulness, behavioral activation, and relapse prevention (73). Most CBT interventions encompass several different components, where each session is dedicated to each component. CBT not only varies in its content, but also in its length and mode of delivery. The typical CBT intervention lasts 8-12 weeks containing one session each week, but some interventions are shorter as well as longer. CBT for PG has been studied as individual treatment, as group therapy, as couple-based therapy and delivered online. A core feature of CBT interventions is the use of manuals, which is also the case in the treatment of PG. In Sweden, only one CBT manual available have been tested in an RCT, "*Till Spelfriheten*" by Liria Ortiz (82).

4.2 CSO TREATMENTS

Given the heavy burden often placed on CSOs of problem gamblers, surprisingly few studies have investigated support for PG CSOs. CSO studies have primarily focused on one of two aims: 1) to support the CSO and to work through the CSO to influence the problem gambler, or 2) to support the CSO and to involve the CSO in PG treatment. In general, trials involving CSOs have been limited in the number of participants enrolled, and have yet to produce results that clearly points to the best ways to engage CSOs in PG treatment.

As for trials working solely with the CSO to influence the problem gambler, a handful of studies have investigated the behaviorally grounded therapy *Community Reinforcement and Family Training* (CRAFT) (83-85), which was originally developed to work with spouses of individuals with alcohol use problems (86). While successful within other fields of addiction (87), CRAFT has largely failed to reach its overarching aim of motivating the problem gambler to seek treatment by working with CSOs. There are many possible explanations for this; one may be that CRAFT studies in other fields have consisted of intense therapy with highly experienced therapists, whereas most gambling CRAFT studies have relied on less

treatment intense interventions (84, 85). There is also the possibility that the features of problem gambling differ from other addictions in important ways, which would explain the difference in treatment outcomes for CRAFT. One such difference could be the ability for outsiders to detect when the problematic behavior occurs. While alcohol use produces clear physiological signs such as smell or affected motor balance, engaging in gambling produces no such signs. CRAFT postulates that the CSO should encourage sober behavior, but since gambling can be made in secrecy at virtually any time, identifying desistance is difficult.

4.3 CSOS IN PG TREATMENT

A few studies have pointed to the possible benefits of involving CSOs in problem gambling treatment for the gambler. The concern for loved ones, as well as pressure from the same loved ones, is often quoted as one of the reasons for problem gamblers to seek help (88, 89). Involving CSOs seems to increase the odds for successful treatment, as well as the likelihood to stay in treatment (90, 91).

There is also a risk that CSOs, sometimes unintendedly, assist the gambler in ways that ultimately may aggravate the problems (92), which would be another reason to involve them in treatment. CSOs could, despite the best intentions, end up prolonging the problems, by for example paying bills that are due, or lying to others about the extent of gambling. Some studies have also pointed to the tendency for CSOs to strive for greater control over the problem gambler as a response to the gambling, which in turn could make gamblers more inclined to gamble (93). Living with a problem gambler may put pressure on the relationship and conflicts are often inevitable, and such conflicts have also been identified as precursors of relapses (94). Problem gamblers with CSOs who themselves have a favorable view on gambling, and might gamble themselves, are also more likely to relapse (94).

It should be noted that some of the trials finding benefits from involving CSOs in treatment have merely observed that problem gamblers bringing CSOs to treatment have better outcomes and adherence (95). This could be explained by other factors than the involvement of CSOs in treatment; it is likely that it indicates an existing social support that problem gamblers not bringing CSOs to treatment might lack. It should also be noted that the view on involvement of family members in clinical care could vary according to the cultural context.

A few studies have focused on treating problem gambling as a couple- or family issue. *Congruence couples therapy*, a method stemming from systemic family therapy, has been evaluated in two different trials (96, 97). It involves the partner of the problem gambler and treats the problem gambling as a family issue. Both studies are small (n=15 couples and n=21

couples) and conducted by the same research group, but have shown some promise in lowering gambling symptoms and increasing well-being. *Adapted couple therapy* (98) also involves the problem gambler as well as a partner, and lends elements from *behavioral couples therapy* (BCT) (99). The adapted couple therapy has so far not been evaluated in research, but the same research group have developed the similar concept of *integrated couple treatment* for pathological gambling, which has been qualitatively evaluated in one trial (n=21 couples) (100).

In studies on treatment for alcohol- and drug problems, BCT has been used as a method to involve CSOs in treatment and thereby enhance adherence as well as treatment outcome for the person with addiction problems (99). As the name suggests, BCT is based on behavioral principles and relies on components such as functional analysis and reinforcement of positive behaviors, as well as shared activities between the CSO and the person with addiction problems. BCT was originally developed for alcohol abusing men and their wives, but has since been adapted for different types of relationships and different types of addictions. BCT has robust scientific support for other types of addictions (87), but has previous to the studies in this thesis not been studied in a PG context.

In sum, the research on involvement of CSOs in problem gambling treatment is still in its infancy. This is somewhat surprising given the obvious toll problem gambling takes on family and friends, as well as the general assumption that CSO involvement in problem gambling treatment could be beneficial for both the gambler and the CSO.

4.4 CHALLENGES IN TREATMENTS OF PG

Meta-analyses of treatments for PG generally describe CBT protocols as “promising”, which relates to overall high efficacy in reducing gambling, PG symptoms and symptoms of other mental ill-health (73). But there are also substantial challenges in CBT treatments for PG, as well as for other treatment approaches for PG. First, many studies on PG treatment are marred with high levels of attrition. A meta-analysis from 2007 of twelve intervention studies estimated that on average 31% of participants in PG treatment studies drop out of the treatment prematurely (76). There is reason to assume that attrition is not completely random, but correlated to certain specific factors such as age, comorbidity, PG severity, gender or socio-economic status. This would affect what conclusions that can be drawn from PG interventions studies, even though we can to some extent statistically compensate for missing data by for example multiple imputation and maximum likelihood estimations. So far, there is little research on what factors could explain the high levels of attrition, and, thus, how to

counter it. Investigating twelve intervention studies, Melville et al. (76) found that no factor occurred in more than one of the included studies, but it seems as if problem gamblers were most likely drop out in the first few sessions of treatment (101). A qualitative study identified shame, guilt, a lack of readiness to change and the need to continue gambling to alleviate negative emotions as some of the themes related to drop-out form treatment (102). But the authors also noted that many patients dropped out from treatment when they felt that they had recovered from PG.

Second, the changes in gambling among problem gamblers are often very swift, from very intense gambling to no gambling at all. The general trajectory when seeking treatment is that a large proportion of gamblers stop gambling altogether, regardless of type of intervention (103). This makes it difficult to compare interventions, since common factors associated with the process of seeking treatment itself seems to prompt abstinence. Many problem gamblers have thus already quit gambling when treatment starts. However, a majority of problem gamblers relapse (94), which calls for trials with longer follow-up periods, which unfortunately has been rare in problem gambling research.

Third, treatment seeking among problem gamblers is low. It is estimated that only between 5-12% of problem gamblers ever seek formal treatment (30, 104). Natural recovery and lack of treatment access can explain some of this, but shame and stigma related to PG and PG treatment, and denial of problems are also important factors (89, 105-107).

4.5 INTERNET AS A TREATMENT PLATFORM

An increasing number of trials have investigated internet-based interventions for various psychological and physical health problems (108). There are several reasons for this, not least because internet-mediated interventions are easily accessible, flexible, cost-effective and not limited to a particular clinic. Also, they have also been shown to be highly effective, often comparable to face-to face treatments (109, 110). Models for internet-based interventions differ in how active the user is supposed to be, whether a therapist is involved, and in the technical properties of the platform (111). Some interventions are designed to provide basic but tailored information about habits or behaviors, while other interventions consist of extensive text material, short films, chat, and support via e-mail and telephone. For PG, several studies have investigated internet interventions, with largely positive outcomes (112-116), all of them Internet based Cognitive Behavioral Therapies (ICBT). One advantage of internet-based interventions is that it could help overcome some of the obstacles associated with PG studies, such as stigma and shame as barriers for seeking treatment. On the other

hand, internet-based treatments tend to have high rates of attrition (117), which is also a challenge in PG interventions.

For the purposes of the studies included in this thesis, the Iterapi platform (118) developed by researchers at the Linköping University, Sweden was used.

5 SUMMARY

PG is relatively common and affects not only the gambler, but also CSOs. The harms of PG include financial difficulties, relationship problems and psychological and physical health problems. PG can be explained by various interconnected factors, from a cultural and societal level to a molecular level. The biopsychosocial model tries to incorporate these factors into one model, based on assumptions from cognitive and behavioral theories. The pathways model has the same theoretical underpinnings but identifies three separate pathways into PG. CBT treatments have generally produced positive outcomes, but the studies lack long time follow-up measures and the drop-out rates are generally high. CSO involvement has mostly been studied in the context of a specific intervention – CRAFT – and while the results point to reductions in stress and ill-health among CSOs, the approach seems to have little impact on the gambling itself. Involving CSOs directly in PG treatment seems to enhance the results for the gambler and to increase treatment seeking, but the results are still rather preliminary.

6 AIMS OF THE THESIS

The overall aim of the present thesis is to study the outcome of Internet-based interventions for problem gamblers and CSOs, the effect of involving CSOs in PG treatment, reasons for drop-out, and the concordance of gambling measures between gamblers and CSOs. The aim of each paper is listed below:

I. Study I was a pilot study of BCT involving both the gambler and a CSO, versus CBT for the gambler only. The primary aim of this pilot was to investigate the feasibility of the program (Gambling Free Together) before conducting a full-scale RCT. A secondary aim of Study I was to investigate whether the involvement of CSOs in treatment would affect treatment response among problem gamblers in an Internet-delivered pilot study comparing two conditions: BCT involving both the gambler and a CSO versus CBT for the gambler only.

II. Study II made use of data collected from participants in Study I and IV. The aim of Study II was twofold. First, to investigate the level of agreement between the gambler and their CSO in terms of the money lost when gambling, as well as to determine whether the level of agreement is associated with the CSOs type of relationship to the gambler. Second, to investigate if other response distributions than the normal distribution provided a better fit when modeling the level of agreement with regard to gambling losses.

III. The aim of study III was to evaluate an internet-delivered CBT-CSO program inspired by CRAFT in terms of gambling-related harm, and treatment-seeking rate and the relationship and mental health of CSOs. The aim was to investigate whether: (1) the CBT-CSO program would lead to a reduction in gambling-related harm, and a greater treatment-seeking rate, (2) the CBT-CSO program would reduce the CSOs anxiety and depressive feelings, (3) the CBT-CSO program would decrease the amount of time and money spent on gambling by the individual who gambles, and (4) the CBT-CSO program would increase the CSOs relationship satisfaction with the individual with PG.

IV. Study IV was a RCT of BCT versus individual CBT for the problem gambler (i.e. the full RCT building on the results from Study I). The aims of study IV were to compare: (1) treatment response in terms of gambling, mental health, relationship satisfaction and adherence to treatment of PG in two ICBT conditions: BCT involving both the gambler and a CSO and CBT involving only the gambler, and (2) compare

the treatment effects on the participating CSOs in terms of mental health and relationship satisfaction.

V. Study V was a qualitative study building on semi-structured interviews with participants, both gamblers and CSOs, in Study IV. The aims of Study V were to explore reasons for drop-outs, help-seeking and participants' views regarding what constitutes an efficient treatment for PG.

7 EMPIRICAL STUDIES

Five different papers are included in this thesis. The papers cover two different interventions for PG and focus on various specific aspects of these treatments such as main outcomes, reasons for drop-out and concordance in measurements of gambling between the gambler and the CSO.

Four of the articles, Study I, II, IV and V, cover different aspects of the study Gambling Free Together, an internet-based randomized controlled trial for problem gamblers and CSOs. Study I covers the pilot testing and feasibility study of Gambling Free Together, Study II the concurrence of measures of gambling between participating gamblers and CSOs, Study IV the main outcomes from Gambling Free Together, and Study V is a qualitative analysis of reasons for drop-out from the treatment. Study III covers the Concerned Significant Other Study, a randomized controlled study involving only CSOs of problem gamblers. Studies I, II and III have all been published in scientific journals, Study IV is at the time of writing submitted and re-submitted for publishing, and Study V is in manuscript form. Table 2 gives an overview of the outcome measures used, and Table 3 a brief overview of the treatment content in the three RCTs included in the thesis. Figure 2 displays a screenshot from the treatment platform used in Study I and IV, Figure 3 a screenshot from the platform used in Study III.

Table 2. Overview of outcome measures.

Name	Used for*	Study	Reference
The Problem Gambling Severity Index (PGSI).	Screening for PG the previous 12 months. Administered pre-treatment.	I, III, IV	Ferris, J., & Wynne, H. (2001). The Canadian problem gambling index. Ottawa, ON: Canadian Centre on Substance Abuse.
The National Opinion Research Center Screen for Gambling Problem (NODS).	PG outcome measure, measuring symptoms previous 30 days. Administered pre-treatment and at all follow-ups.	I, IV	Wickwire Jr, E. M., Burke, R. S., Brown, S. A., Parker, J. D., & May, R. K. (2008). Psychometric evaluation of the National Opinion Research Center DSM-IV Screen for Gambling Problems (NODS). *The American Journal on Addictions*, *17*(5), 392-395.
Inventory of Consequences Scale for the Gambler and CSO (ICS).	Measures consequences of PG for gambler and CSO. Administered pre-treatment and at all follow-ups.	I, III, IV	Hodgins, D. C., Shead, N. W., & Makarchuk, K. (2007). Relationship satisfaction and psychological distress among concerned significant others of pathological gamblers. *The Journal of Nervous and Mental Disease*, *195*(1), 65-71.
Time-Line Follow-Back for Gambling	PG outcome measure, measuring days gambled and money lost to gambling	I, II, III, IV	Weinstock, J., Whelan, J. P., & Meyers, A. W. (2004). Behavioral assessment of gambling: an application of the timeline followback method. *Psychological*

(TLFB-G).	previous 7 or 30 days. Administered pre-treatment, weekly during treatment and at all follow-ups.		*assessment*, *16*(1), 72.
The Alcohol Use Disorders Identification Test (AUDIT).	Identifies alcohol use disorders the previous 30 days. Administered pre-treatment and at all follow-ups.	I, III, IV	Bergman, H., & Källmén, H. (2002). Alcohol use among Swedes and a psychometric evaluation of the alcohol use disorders identification test. *Alcohol and alcoholism*, *37*(3), 245-251.
The Patient Health Questionnaire-9 (PHQ-9).	Measures depression the previous 30 days. Administered pre-treatment and at all follow-ups.	I, III, IV	Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2010). The patient health questionnaire somatic, anxiety, and depressive symptom scales: a systematic review. *General hospital psychiatry*, *32*(4), 345-359.
The Generalized Anxiety Disorder 7-item scale (GAD-7).	Measures anxiety the previous 30 days. Administered pre-treatment and at all follow-ups.	I, III, IV	Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*, *166*(10), 1092-1097.
World Health Organization's Quality of Life Assessment (WHOQOL-BREF).	Measures quality of life. Administered pre-treatment and at all follow-ups.	III	Skevington, S. M., Lotfy, M., & O'Connell, K. A. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group. *Quality of Life Research*, *13*(2), 299–310
The Relation Assessment Scale Generic (RAS-G).	Measures relationship satisfaction. Administered pre-treatment, weekly during treatment and at all follow-ups.	I, III, IV	Rask, M., Malm, D., Kristofferzon, M. L., Roxberg, Å., Svedberg, P., Arenhall, E., ... & Nilsson, U. (2010). Validity and reliability of a Swedish version of the Relationship Assessment Scale (RAS): a pilot study. *Canadian Journal of Cardiovascular Nursing*, *20*(1).

Table 3. Treatment content.

Module	CBT gambler*	BCT gambler*	BCT CSO*	CSO CRAFT**
1	*Introduction* *Psychoeducation* (17 773 characters, 3 videos, 2 exercises)	*Introduction* *Psychoeducation* (17 970 characters, 3 videos, 2 exercises)	*Introduction* *Psychoeducation* (21 404 characters, 3 videos, 2 exercises)	*Introduction* *Psychoeducation*
2	*Behavioral analysis* *Economic recovery plan* (10 949 characters, 1	*Behavioral analysis* *Economic recovery plan* (10 921 characters, 1	*Behavioral analysis* *Economic recovery plan* *Enabling* (16 024 characters, 1	*Behavioral analysis* *Shared activities*

	video, 4 exercises)	video, 4 exercises)	video, 6 exercises)	
3	*Motivation enhancement* *Behavioral activation* (13 825 characters, 1 video, 8 exercises)	*Motivation enhancement* *Behavioral activation* (14 586 characters, 1 video, 8 exercises)	*Behavioral activation* *Shared activities* (13 819 characters, 0 videos, 8 exercises)	*Behavioral activation* *Shared activities*
4	*Cognitive restructuring* (12 481 characters, 2 videos, 5 exercises)	*Cognitive restructuring* (12 574 characters, 2 videos, 5 exercises)	*Motivation enhancement* (6 804 characters, 0 videos, 8 exercises)	*Motivation enhancement* *Economy*
5	*Values and goals* (8 832 characters, 1 video, 7 exercises)	*Values and goals* (10 618 characters, 1 videos, 9 exercises)	*Economic recovery* (9 956 characters, 0 videos, 7 exercises)	*Enabling*
6	*Economic recovery* (10 043 characters, 0 videos, 7 exercises)	*Communication skills training* (21 071 characters, 1 videos, 6 exercises)	*Communication skills training* (22 074 characters, 1 videos, 6 exercises)	*Communication skills training*
7	*Communication skills training* (12 993 characters, 1 video, 5 exercises)	*Communication skills training* (11 951 characters, 1 video, 4 exercises)	*Communication skills training* (11 648 characters, 1 video, 4 exercises)	*Problem-solving*
8	*Communication skills training* (11 972 characters, 1 video, 4 exercises)	*Reinforce positive behaviors* (8 976 characters, 1 video, 5 exercises)	*Reinforce positive behaviors* (8 899 characters, 1 videos, 5 exercises)	*Inviting the gambler to treatment*
9	*Relapse prevention* (11 827 characters, 1 video, 6 exercises)	*Relapse prevention* (13 979 characters, 1 video, 8 exercises)	*Relapse prevention* (11 034 characters, 1 video, 6 exercises)	*Repetition*
10	*Repetition* (6 982 characters)	*Repetition* (6 813 characters)	*Repetition* (6 811 characters)	–

*Study I, IV, **Study III

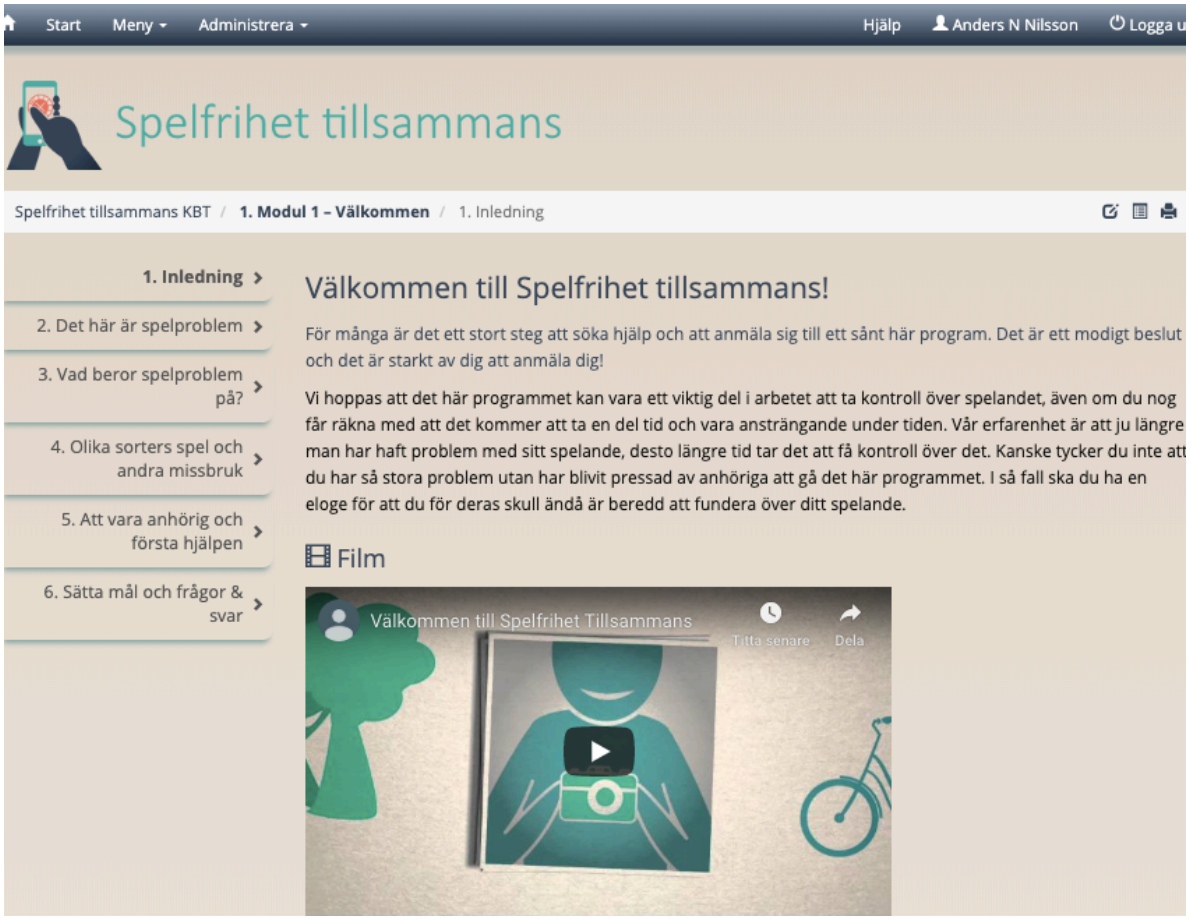

Figure 2: Screenshot from the treatment platform used in Study I and IV.

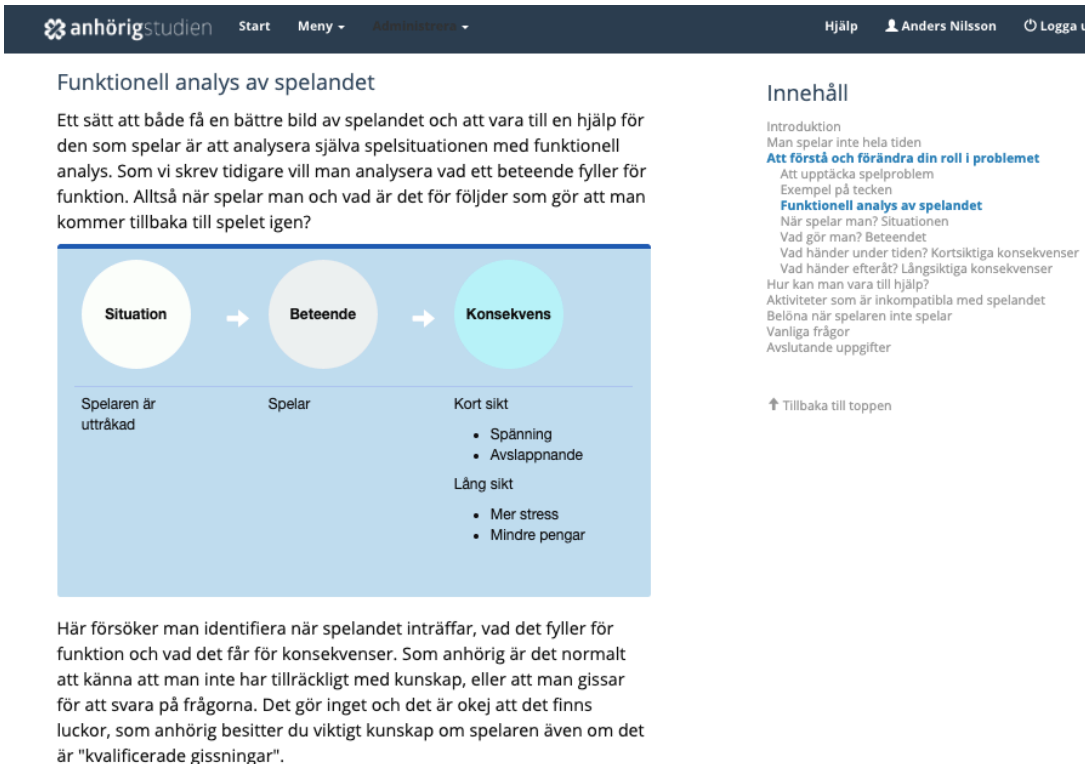

Figure 3: Screenshot from the treatment platform used in Study III.

7.1 STUDY I: THE DEVELOPMENT OF AN INTERNET-BASED TREATMENT FOR PROBLEM GAMBLERS AND CONCERNED SIGNIFICANT OTHERS: A PILOT RANDOMIZED CONTROLLED TRIAL

7.1.1 Background

Several studies indicate that CBT treatments can lower the amount of time and money spent on gambling, as well as levels of psychiatric comorbidity. However, treatment seeking remains low, and drop-out rates are generally high, which calls for new methods to tackle PG. Internet-based interventions could help overcome barriers to treatment seeking by being available and flexible, and involving a CSO could enhance adherence to treatment. Two interventions were compared, one CBT condition and one condition based on BCT. Prior to conducting a full scale RCT, we were eager to gather as much information as possible about the feasibility of such a trial.

7.1.2 Methods

18 dyads (18 problem gamblers and 18 CSOs) were recruited to the study. All participants were required to be older than 18, speak and write Swedish fluently, live permanently in Sweden, and show no signs of severe psychiatric illness. Gambler participants were required to meet the criteria for gambling problems, as defined by the Problem Gambling Severity Index (PGSI), while CSOs where required to be a family member or friend of the problem gambler and show no signs of gambling problem, as measured by PGSI. Participants were randomized into one of two conditions: a) 10 sessions of internet based CBT treatment for both the gambler and the CSO (called BCT condition), or b) 10 sessions of internet based CBT treatment for the gambler only (called CBT condition). The treatments contained texts, short films, images and exercises related to a certain theme such as functional analysis or relapse prevention, see Table 3. The treatment modules were complemented with weekly calls or e-mail contact with an assigned therapist. The participants were asked to fill out measures on gambling, depression, anxiety, alcohol use and relationship satisfaction (see Table 2 for details). Participants were followed until six months' post-treatment. Participants and therapists were also asked about their experiences of the intervention.

7.1.3 Outcomes

Gambler participants in both groups showed rapid reductions in gambling and on secondary outcomes. However, no conclusive differences were found between the two groups of gamblers, but CSOs of those the BCT condition had significantly lower results on measures

of depression and anxiety compared to the CBT group (which for CSOs essentially functioned as a control group). Participants overall rated the treatment highly favorable, but the study was marred by the same type of attrition as other PG studies in the field. The therapists pointed to some issues (i.e. routines and guidelines related to the contact with the participants, and to the administration of the study) that needed to be adjusted or clarified ahead of conducting a full-scale RCT.

7.1.4 Conclusions

The results were promising enough to lead us to the conclusion that it would be valuable to perform a full-scale RCT. The trial rendered some changes and clarifications to the guidelines and routines for therapists, some text revisions and some bug fixes in the treatment platform. The therapists identified two specific challenges possibly related to the study design. First, some problem gamblers seemed to have experienced pressure from their CSOs to participate in treatment, which the therapists believed could create some resistance to change and to the treatment. Second, some components of the BCT treatment were supposed to be shared by the problem gambler and the CSO, but participants were not always synchronized in the pace they advanced in the treatment. This compelled the faster participant to wait, and was often a challenge to the motivation of participants. This prompted us to further emphasize to the participants the importance of keeping to the intended pace of the treatment in the full-scale RCT.

7.2 STUDY II: LEVEL OF AGREEMENT BETWEEN PROBLEM GAMBLERS' AND COLLATERALS' REPORTS: A BAYESIAN RANDOM-EFFECTS TWO-PART MODEL

7.2.1 Background

Self-reports of gambling are essential measurements of PG in research and clinical practice, and one way of corroborating these reports is by comparing them to reports by CSOs. As has been mentioned, one of the difficulties with CSO involvement in PG treatment is that it is difficult for CSOs to identify when someone has gambled, and little is known about how much CSOs actually know about the gambling. This study aimed to investigate the intraclass correlation coefficients (ICCs) concerning money lost, debt caused by gambling and years gambled by comparing gambler and CSO reports, and whether it differs as a function of relationship type. It also aimed to compare different assumptions regarding response distribution for money lost (Gaussian, two-part gamma and two-part lognormal) and its effect

on the results. The reason is that data on money lost is highly skewed, and includes zeroes (no losses reported for a certain day), which violates the assumptions of normality.

7.2.2 Method

Data was collected regarding gambling losses the 30 days prior to inclusion, years of problem gambling and gambling related debt. The data was taken from Gambling Free Together, both the pilot study and the RCT study (n=266 individuals/133 dyads). It was used to calculate ICCs for the level of agreement between the problem gambler and the CSO in each dyad. For money lost we used a two-part model that splits the model in two different parts: one binary for the presence of zeros, and one continuous for all other responses. We used a generalized linear mixed-effects model (GLMM) with random effects to model variance between and within dyads. Agreement was also analyzed as a function of the type of relationship, i.e. partner, parent or other (siblings, friends or children of problem gamblers). Furthermore, a small simulation study investigated ICCs using different types of response distribution assumptions; Gaussian, two-part gamma and two-part lognormal.

7.2.3 Outcomes

The results on money lost pointed to a fair agreement overall between the gambler and their CSO, ICC = .57, 95% CI (.48, .64), and that partner CSOs tended to report in greater agreement with the gambler than parent CSOs, ICCdiff = .20, 95% CI (.03, .39). Secondary measures painted a mixed picture where parent CSOs had the highest agreement on gambling related debt, ICC = .75, 95% CI (.61, .82), and other CSOs the highest agreement on years with problem gambling, ICC = .92, 95% CI (.78, .99). The simulation study showed that the ICCs were much higher when using a normal distribution for money lost, compared to gamma or lognormal distribution. Furthermore, the normal distribution showed low precision compared to the other types of distributions.

7.2.4 Conclusions

The results indicated that CSOs have a fairly good insight into the problem gamblers gambling, both in terms of money lost, gambling related debt and years of problem gambling. This could be relevant when designing studies that involve CSOs since certain treatment components could contain interventions tailored to encourage reinforcement of gambling abstinence. Partners seem to have a little more insight than parents and other types of CSOs, but this could also be a function of spending more time with the gambler, compared to other CSOs. But it is also likely that many partners have a shared economy and thus a spouse has

relatively good insight into the economy. It should be remembered, however, that the data was collected under very specific consequences: both were enrolling in a treatment study and were likely to at least touch upon the subject before signing up. Previous research has indicated that gamblers themselves might have limited insight into their gambling, even though most participants in this study gambled online, which makes money spent easier to control retrospectively.

The simulation study pointed to the importance of using a model that allows for the distribution to be skewed when reporting money lost in gambling. Using a normal distribution will likely produce highly unreliable results. The agreement was fairly high using all three types of data distribution, but the normal distribution produced higher levels of agreement.

7.3 STUDY III: INTERNET-DELIVERED COGNITIVE-BEHAVIORAL THERAPY FOR SIGNIFICANT OTHERS OF TREATMENT-REFUSING PROBLEM GAMBLERS: A RANDOMIZED WAIT-LIST CONTROLLED TRIAL

7.3.1 Background

A long line of research has pointed to the harm caused by PG on CSOs of problem gamblers, but also the positive role CSOs can play in the help-seeking and recovery process. This RCT study aimed to investigate the effects of the CBT-based internet-intervention the Concerned Significant Other Study on a) gambling-related harm, b) the gambler's help-seeking, and c) the relationship satisfaction of CSOs of treatment-refusing problem gamblers. The Concerned Significant Other Study is an internet-mediated intervention provided to CSOs of problem gamblers, and the intervention combined components primarily aimed at increasing the well-being of the CSO and components primarily aimed at changing the problem gamblers gambling and ultimately motivate him or her seek treatment. The intervention was inspired by CRAFT approaches to addictions, and relied quite heavily on analyzing the psychological functions of behaviors to promote gambling free behaviors, and to substitute gambling with other activities.

7.3.2 Method

All participants were required to be over 18 years old, speak and read Swedish fluently, to be a partner, friend, sibling, parent or child of a problem gambler, and that they had known each other for at least three months. The problem gambler was required to be judged to fulfill the criteria for gambling problems according to PGSI, and being unwilling to seek treatment,

while the CSO could show no signs of gambling problems. Participants (n=100) were randomized into one of two conditions: CBT for CSOs of treatment-refusing problem gamblers or a wait-list control group. The intervention consisted of nine modules with text, short films and exercises related to a certain theme such as communication or reinforcing positive behavior. The participants received weekly phone calls or e-mails from their assigned therapist.

The participants filled out measurements on negative consequences caused by the gambling, gambling-related outcomes such as treatment engagement and money spent on gambling, psychological wellbeing for the CSO and relationship satisfaction (see Table 2 for details on outcome measures). The results were analyzed using linear mixed-effect models (LMMs), assuming the data to be missing at random (MAR). We also performed a dose-response analysis of adherence to treatment to see if adherence had a causal effect.

7.3.3 Outcomes

In general, the study showed moderate improvements on outcomes regarding the psychological well-being of the participants compared to the wait-list condition, e.g. ICS Cohen's d = -0.90, 95% CI [-1.47, -0.33]. However, no important improvements regarding gambling-related outcomes, including treatment seeking, were found. A dose-response was found, indicating that more time spent on the platform was associated with better treatment outcomes.

7.3.4 Conclusions

The trial showed similar results as previous trials investigating support for CSOs of problem gamblers: the intervention has an effect on well-being of the CSO, but not on gambling or treatment seeking. It also follows a pattern where adherence to treatment is quite low, and a majority of participants never reached the module which focused on treatment seeking. One speculation is that PG differs somewhat from alcohol- and drug use disorders, e.g. by not producing physical signs which makes it more difficult to identify when someone is gambling. Furthermore, similar trials in other fields of addiction have generally involved quite extensive treatments with intensive role-playing, as opposed to the briefer interventions offered to CSOs of problem gamblers in this trail and other PG trials. The results could also have been hampered by a lack of accessibility to relevant treatments for PG in Sweden at the time.

7.4 STUDY IV: BEHAVIORAL COUPLES THERAPY VS COGNITIVE BEHAVIORAL THERAPY FOR PROBLEM GAMBLING: A RANDOMIZED CONTROLLED TRIAL

7.4.1 Background

Study I showed that it was feasible to conduct an internet based intervention for problem gamblers and their CSOs, and thus a full-scale RCT was undertaken with the same overall design and aim. Some changes were made to the routines and guidelines for therapists, in accordance with suggestions by participants and therapists in the pilot trial. While the outcomes in the pilot study were inconclusive regarding the relative efficacy of the two treatments, a longer follow-up period could paint a clearer picture of long-term effects of treatment.

7.4.2 Method

A total of 136 dyads (136 gamblers and 136 CSOs) were recruited to the study. All participants were required to be older than 18, speak and write Swedish fluently, live permanently in Sweden, and show no signs of severe psychiatric illness. Gambler participants were required to meet the criteria for gambling problems, as defined receiving a score of 8 or above on the Problem Gambling Severity Index (PGSI), while CSOs where required to be a family member or friend of the problem gambler and show no signs of gambling problem, as measured by PGSI. Participants were randomized into one of two conditions: a) 10 sessions of internet-based CBT treatment for both the gambler and the CSO (the BCT condition), or b) 10 sessions of internet based CBT treatment for the gambler only (the CBT condition). The treatments contained texts, short films, images and exercises related to a certain theme such as communication training or relapse prevention, see Table 3. The treatment modules were complemented with weekly calls or e-mail contact with an assigned therapist. The participants were instructed to fill out measurements weekly during treatment, post-treatment, and at 3-, 6, and 12-months post treatment. The questionnaires contained items on gambling, depression, anxiety, alcohol use and relationship satisfaction. Adherence was measured as number of modules completed. The outcomes were analyzed using generalized linear mixed effects models (GLMMs).

7.4.3 Outcomes

For the gamblers, the results were inconclusive for all measures. Participants in both groups improved greatly from baseline measures, but no intergroup differences were detected: the

multiplicative effect of TLFB-G = .80 [0.24;2.36]. Adherence was rather poor, but there was a tendency for gamblers in the BCT arm to be more likely to commence treatment compared to the gamblers in the CBT arm. On the other hand, they returned fewer follow-up measures. For the CSOs, the results were surprisingly similar between the groups, despite the fact that the CSOs in the CBT group did not receive any specific intervention.

7.4.4 Conclusions

While both groups improved on all outcomes, the differences were small and inconclusive and adherence was not higher in the BCT group. There are several possible explanations for this. First, internet-based interventions are easily accessible, and have a low threshold for entering treatment, but possibly also for dropping out of treatment. Second, the process leading up to study inclusion could be seen as a short-term intervention itself, and CSOs were thus involved in treatment to some extent in both conditions. While enrolling in the study CSOs and gamblers were prompted to reflect on the gambling, communicate with each other and the therapist about the gambling and related issues, all of which could have a therapeutic effect. This makes it more difficult to isolate the effect of the more extensive BCT intervention. Third, there were some indication that some problem gamblers were coaxed to partake in treatment by their CSOs, which could have affected motivation. This could be a problem that arises mostly due to the study design, where both a problem gambler and a CSO has to partake. Fourth, it is a challenge to deliver couple therapy online, since participants were often unsynchronized in the pace they moved along in therapy.

7.5 STUDY V: REASONS FOR DROPPING OUT OF PROBLEM GAMBLING TREATMENT, PREFERRED TREATMENT AND THE PROCESS TO GET THERE. A QUALITATIVE ASSESSMENT WITH PROBLEM GAMBLERS AND CONCERNED SIGNIFICANT OTHERS.

7.5.1 Background

One of the main challenges in PG treatments is the high attrition and low adherence. This poses a threat to the validity of PG research, since missing data make findings less reliable and robust. Some studies have examined predictors of drop-out, such as age and PG severity, but little is known about why participants drop out of treatment. Since participants dropping out rarely return follow-up measurements, we can neither assume that participants dropping out have worse nor better outcomes than those that stay put. While quantitative analysis can teach us about patterns preceding attrition, it is limited in how much it can teach us about

how to prevent it. This study aimed at gaining information about a) reasons for dropping out, b) what the treatment seeking process looked like, and c) how treatments can be improved to better accommodate participants who have chosen to discontinue their participation.

7.5.2 Method

16 participants (8 gamblers and 8 CSOs) from the RCT Gambling Free Together were interviewed about treatment drop-out, help-seeking and their views regarding what constitutes an effective treatment for PG. All gamblers had dropped out pre-maturely, and the CSOs were CSOs of gamblers who had dropped out pre-maturely. The interviews were semi-structured, conducted over telephone and lasted on average 15 minutes. Thematic analysis was chosen as the analytical framework. The interviews were transcribed, coded and lastly analyzed for themes mainly evolving around dropout from treatment, the process of help-seeking, and how PG interventions should be modelled.

7.5.3 Outcomes

The results in this study were categorized according to the three research questions, and themes and sub-themes were identified under each category. Regarding treatment drop-out, two themes were identified: context-related drop-out, which had to do with various life events, and emotion-related drop-out, which had to do with the participants' emotional state at the time. In the treatment-seeking category, the themes of treatment structure, referring to the role of the study design for seeking treatment, and fluctuations referring to the tendency to hop on and off treatments. The category on opinions about treatment consisted of three themes: CSO involvement, which consisted of opinions about CSO involvement, openness about important processes and components of treatment, and framework about how treatment should be delivered and organized.

7.5.4 Conclusions

The reasons for drop-out were quite heterogeneous, but largely unrelated to the treatment itself. The most important theme was related to negative emotions as related to drop-out, but some participants also mentioned that they had recovered, which made treatment seem unnecessary at the time. Regarding treatment seeking, many participants seemed to have an ambivalent take on change and on treatment, trying several different treatment options, but also benefitting from a very small dose of treatment. For many participants, meeting others with similar experiences was the most important part of PG treatments.

8 ETHICAL CONSIDERATIONS

In any research involving humans one has to weigh the potential benefits of the research against the risks for the participants. The studies included in this thesis have all been reviewed and approved by the regional ethics board of Stockholm in order to ensure the safety and integrity of the participants.

Some of the ethical issues raised in the projects were related to the possibility of severe mental ill-health among the participants. PG is often comorbid with other mental health issues, and especially the high rates of suicide ideation among problem gamblers was of particular concern for us beforehand. Therapists were instructed to screen for suicidal ideation, as well as other severe psychiatric problems, using guidelines compiled by the study team. Therapists also received supervision with the stated aim to discuss cases where admittance to the treatment was unclear, e.g. because of psychiatric problems. The study team was also composed of several licensed psychologists and psychiatrists, with long experience of working with psychiatric ill-health. There were a few instances where therapists had to refer prospective participants to more suitable treatment options, and no serious incidents were reported.

In psychological treatments, there is always a risk that participants deteriorate in regards to the condition they have sought treatment for, during the course of treatment. This could be the result of being confronted with negative aspects of one's life and the consequences of gambling, such as being made aware of the exact amount of money lost to gambling or experiencing shame and guilt over neglecting family and friends. It could also include disappointment and hopelessness related to a lack of treatment response. The answer to these risks is of course to construct the treatment in order to relieve participants of some of the shame, and to equip them with strategies how to handle difficult aspects of their lives. In some cases, the stress caused by the treatment could of course also warrant further treatment, as mentioned above. There is also a risk that CSOs take on a disproportionate part of the responsibility for the PG, carrying the burden for problems they are not the cause of. The treatments included in this thesis all had components that aimed at relieving some of that burden. Another potential risk was that involving CSOs in PG treatments could reinforce some of this behavior. The participation was voluntary, and all participants were required to sign an informed consent agreeing to take part of the study, and for the research team to collect and analyze data on demographic variables, gambling, health and relationship satisfaction. However, given that some of the treatments required the participation of both a

CSO and a gambler, there is a risk that some of the participants were pressured to start or continue treatment. There were no indications, however, of any extortion or inappropriate use of force, but some participants displayed signs of being significantly less motivated than their counterpart. Whether or not this was caused by pressure from the CSO remains unclear; it may also be inevitable with different levels of motivation/engagement in treatment involving more than two individuals.

8.1 DATA SECURITY

Data on demographics, gambling, health, and relationship satisfaction was collected via online questionnaires, and messages between participants and therapists were sent within the Iterapi platform (118). All data traffic was encrypted, and the participants had to log in to the platform using double authentication, in order to ensure data integrity. In Study I and IV, case record files on all participants were kept in a safety box in a locked storage room. The case record files were anonymized, labelled only with a number. The numbers were linked to each participant's study code, but access to the key decoding the numbers was only granted to me and a research assistant. The study code was generated automatically when participants signed up for the study, and allowed communication without mentioning participants' names. In Study III, data on the gambling of a problem gambler was collected by proxy by a CSO. While the identity of the gambler was unknown to the therapist and the study team, the fact that the CSO were making observations on the behavior of the gambler and reporting them to the study team could be seen as a threat to the integrity of the gambler. However, providing and investigating support for CSO was deemed of superior priority and importance, and would have been difficult to evaluate without any indications of the behavior of the problem gambler.

9 DISCUSSION

The paramount aim of all included studies in this thesis was to add to the body of knowledge on problem gambling and its treatment. The results from these studies highlight the complexity that characterize the study of PG. Despite the intention to generate quite the opposite, the trials had high levels of attrition, and despite promising results from previous studies, involving CSOs in treatment did not significantly affect the outcomes. Add to that the inherently pendulous and heterogeneous nature of PG, and the statistical irregularities that the measurements of money lost to gambling produce. Together this points to a condition that is sometimes perhaps more difficult to study than to treat. The experiences and results from the included studies will hopefully help advance the study of PG, in terms of how to treat it, how to design studies, how to increase adherence to treatment, and how to analyze PG data.

9.1 CONCERNED SIGNIFICANT OTHERS AND PROBLEM GAMBLING TREATMENT

Previous research has pointed to the benefits of involving CSOs in PG treatment, such as benefitting the well-being of the CSOs, the positive impact it can have on interventions for the problem gambler, and how it can increase gamblers' adherence to treatment (91). The studies included in this thesis are some of the largest conducted on the topic, and the results are somewhat inconsistent with previous results. Study IV produced results that were inconclusive regarding the involvement of CSOs in PG treatments; there was no significant difference between the conditions. Study III did produce positive outcomes for CSOs, but failed to affect the gambling of the problem gambler, and this actually is in line with previous research in the field.

There is reason to believe that some of the results can be explained by common factors, shared by all participants regardless of treatment condition. The process of enrollment in the treatment studies entailed, in this case, answering almost 200 questions regarding one's background, gambling, health, and relationship satisfaction, along with a screening interview conducted over telephone. To some extent, this equals a brief intervention in itself, and the gambler and CSO in Studies I and IV were required to at least briefly touch upon subjects related to PG before and during the process of signing up. Previous studies have suggested that brief interventions, lasting only a few sessions, might have equal outcomes as more full-length treatment protocols (119). Taken together, it could be argued that many participants in both Gambling Free Together and the Concerned Significant Other Study had already

undertaken some essential steps in changing their behavior before entering treatment. The rapid and extensive decreases in gambling in Gambling Free Together also support this impression.

CSO involvement has been assumed to be beneficial for PG treatment outcomes, but results from Gambling Free Together pointed to some paradoxical effects. The therapists suspected that some gamblers were pushed into treatment by their CSOs, which was later confirmed by some of the participants who were interviewed about their discontinuation in treatment. The underlying assumption of Gambling Free Together was that problem gamblers would involve CSOs in treatment for support, but to some extent the opposite occurred, and CSOs pressured gamblers to participate in treatment. While this is likely to happen also in individual PG treatments, enrolling together with a partner or parent who is highly critical of one's gambling might have an especially detrimental effect on the motivation to participate. The treatment itself is also likely to elicit memories and emotions related to negative aspect of one's life, and the CSOs could serve as a reminder of these. In a face-to-face setting, such themes could be immediately handled by the therapist, but Internet-based treatments rarely provides that opportunity.

Furthermore, the results regarding involvement of CSOs and adherence to treatment for problem gamblers were inconclusive. BCT gamblers initiated treatment to a greater extent, and the mean number of modules completed was slightly higher, but more CBT gamblers completed all modules. It indicates that CSO involvement is not undoubtedly favorable for treatment adherence, but instead the relationship seems to be more complex. It should also be noted that CSOs as a group themselves had rather poor adherence to treatment with less than half completing all modules in Study III and IV. During the course of treatment, some CSO participants also withdrew from the study since they had decided to discontinue any contact they had with the gambler.

9.2 TREATING PG ONLINE

All the interventions in the three RCTs included in this thesis were delivered online with telephone support. While several other PG interventions have been delivered online (112, 113, 115, 120), the RCTs in this thesis are, to the best of my knowledge, the first ICBT trials involving CSOs and the first involving more than one participant in treatment. Internet-based interventions have sometimes been associated with higher levels of attrition than face-to-face treatments (117), and some of the results in our trials point to such a trend. One possible explanation of the results of the RCTs is obviously that face-to-face versions of the same

interventions could have produced better and more robust outcomes, with higher adherence to treatment. This is to some extent supported by the interviews in Study V, which identifies disbeliefs, as well as misconceptions, regarding the Internet format as two of the reasons for dropping out. On the other hand, the qualitative assessments also revealed that an Internet-based intervention was often seen as the only possible option for participants, due to reluctance to seek face-to-face treatments, appreciation of the flexibility and anonymity of the Internet format, or for a lack of access other treatment options nearby. These findings are in line with previous research which has investigated the motives for problem gamblers as well as CSOs to access various types of online support for PG (121-124). In essence, Internet-based treatments seem to attract people who might otherwise not have entered treatment, but some participants might not have dropped out had it been a face-to-face intervention. It should also be noted that Internet based interventions are generally more cost-effective, and can thus be offered at a larger scale than traditional interventions. It is also likely that face-to-face and Internet based interventions complement each other: different treatment delivery methods work differently for different participants and at different times.

As noted in the discussion section of Study IV, the meta-study on deterioration among participants in Internet interventions (125), singled out couple therapies as especially prone to produce negative outcomes. The therapists involved in the Study I also noted the challenges in working with two individuals to solve shared problems without having the opportunity to communicate with them simultaneously.

9.3 THE CHARACTERISTICS OF PROBLEM GAMBLING

Apart from the 408 individuals who eventually enrolled in the three RCTs, another 362 persons signed up without finalizing the enrollment process, and, as noted, a large portion of those who started treatment did not finish. Qualitative interviews pointed to patterns of recurring relapses, varying motivation, but also many instances of self-recovery. Many gamblers, 34% of those who signed up for Study IV and 32% in Study III, had previously sought treatment, and 85% in Study IV and 66% in Study III had previously made attempts to quit. Together with the observation that the participants reported stopping spending money on gambling rapidly when entering treatment, it points to PG being a condition that fluctuates over time, which has also been found in several longitudinal studies (126-128). It is also likely that comorbid conditions play a large role in recovery and relapse, which was also highlighted by participants in Study V who mentioned things such as "*if I had felt better, it (the treatment) would have been great*" and "*My son had an incredibly tough time and used*

the gambling as an escape route, and then it escalated. But when his life got back on track, then he didn't have any need to gamble again" as reasons for dropping out.

According to the results of Study V, it seems as the motivation to change and willingness to participate in treatment is closely connected to situational factors – such as access to money, CSOs' control of one's economy, or even sudden gambling wins – that could rapidly change. This could mean that when a person with PG finally starts treatment, his or her situation can be very different from when he or she signed up. Enrollment often occur in a state of panic (129), a state that could seem long gone if some of the most urgent bills are payed or when CSOs are, after much hesitation, informed about the gamblers condition. Study V revealed that many participants dropped out since they did not feel any need for treatment anymore, despite displaying quite severe PG symptoms just weeks earlier. For some it was a true turning point, for others it was a brief period of abstinence before another relapse. In other cases, chaotic circumstances partly caused by PG, such as being evicted or chased by debt collectors could affect the possibility to seek and participate in treatment. Other psychiatric conditions, such as depression and obsessive compulsive disorder, could be argued to have a more gradual pattern of change.

In Study V there was also reason to investigate what the participants did not talk about. When asked about opinions about the treatment, or about what would constitute an ideal treatment, few identified actual treatment components such as alternative activities or communication training. Instead, answers tended to focus on the importance of social support from CSOs, self-recognition when hearing other PG related life stories, or structural characteristics such as accessibility of treatment. Certain participants, believing the follow-up measures composed the actual treatment, were unaware that they had in fact dropped out of treatment. Yet, some of them remained rather satisfied with the "treatment" and their own participation. Others seemed to make little distinction between this treatment, other treatments they had participated in, and the help they received from peer support groups. This indicates that to some participants, the treatment content itself might be of less importance compared to the many other processes involved in treatment and recovery. This also means that simply including a control group in the treatment design might not suffice to isolate the effect of treatment. It is likely that treatments for PG has to be seen as one of several factors contributing to behavior change and recovery. The support from CSOs could be one of those factors, which is possibly manifested in Study IV by the almost threefold percentage of gamblers not commencing treatment at all in the CBT group.

9.4 MEASURING PROBLEM GAMBLING

One of the general questions in PG studies is how to measure its outcomes. Most outcome questionnaires, such as PGSI and NODS, are at least to some extent symptom-based, but also incorporate negative consequences of gambling such as negative effects on relationships. But while such measures are important in order to understand the level of PG severity, they generally lack any concrete measures on the actual gambling.

The Banff, Alberta Consensus (130), which is perhaps the most comprehensive guideline on how to report changes in PG trials, emphasize the use of objective measures such as money lost or days gambling. But this also has some potential pitfalls such as memory biases, or the fact that gamblers might have long periods of abstinence alternated with periods of intense gambling. For instance, very intense gambling might precede abstinence if the gambling creates a lack of money to gamble with, without actually changing the level of PG.

Study II also points to the fact that money lost was unevenly distributed with a disproportionate amount of days with no money lost at all. If this skewed distribution is modelled as a normal distribution, there is a risk that the results are less reliable. In our simulation study, modelling money lost with a Gamma distribution, seemed to produce a more reliable estimation. Another caveat of using money lost as a measurement of PG is that it is actually not as objective a measure as it might be perceived. First of all, 100USD is valued differently depending on one's income, what type of game is played and for how long one has played. Gamblers also tend to spend even amounts, such as 100, 160 or 1500, rather than uneven numbers such as 23 or 1548, which could also interfere with normality assumptions. Second, an increase or decrease in money spent is not necessarily mirrored in PG symptoms. There is a scientific discussion whether money lost in gambling has a threshold, above which gambling is associated with a higher risk of PG (131, 132), or if the risk of PG increases for each unit spent (133).

One way of obtaining more robust data on gambling is by corroborating gambler reports on gambling with CSO reports. The results from Study II indicates that the ICCs were fairly concordant, but that the results could vary according to relationship type. It is likely that by taking CSO reports on gambling, as well as PG symptoms, into account, researchers and clinicians would get a more comprehensive view problem gamblers condition. One of the challenges of CSO involvement in PG interventions is the lack of clear physiological signs when the gambler has gambled. This presumably makes it more difficult for CSOs to employ principles such as "reinforcing sober behavior" compared to interventions targeting substance

use disorders. However, the results in Study II point to a fairly accurate estimation by CSOs of the overall intensity of the gambling. This should not be interpreted as if CSOs can pinpoint exact times when the gambler has gambled, but that their overall understanding of the intensity of problems is likely to be quite correct.

9.5 SUPPORTING CONCERNED SIGNIFICANT OTHERS

CSO involvement in PG treatment often has parallel aims of both supporting the CSO in his or her own right and to work through the CSO to somehow support or influence the problem gambler. The treatment content in the three RCTs included in this thesis were very similar to each other; they were based on fundamental CBT principles, and they shared the dual ambition to support the CSO in his or her own right, and to work through the CSO to support the gambler.

Findings from both Study I and Study III showed that CSO well-being was not necessarily linked to the outcomes of the gambler. While this was not studied directly, this is indicated in Study I where CSOs in the BCT group had larger, and above all faster, improvements than CSOs in the CBT group on all outcomes, while the differences between the two gambler treatments were inconclusive. Similarly, CSOs in Study III, the Concerned Significant Other Study, improved on all outcomes compared to the control group, while the gambling behavior of the gambler did not differ between the groups. This indicates that CSO improvements on measures of psychological well-being is not necessarily dependent on levels of gambling and PG for the problem gambler. This could hypothetically mean that CSOs could benefit more from receiving some type of support themselves, rather than benefitting from positive treatment results on behalf of the problem gambler. However, the findings from the largest RCT, Study IV, where there was no significant difference between the groups, were more inconclusive regarding what benefits CSOs of problem gamblers.

One possibly contributing factor to the somewhat unexpected results of these studies is the fact that the CSO group in itself was rather heterogeneous. There is likely both similarities and differences in how to support a partner of problem gambler as opposed to a parent of a problem gambler, as well as how they could best support the problem gambler. Previous studies involving CSOs in PG interventions have predominantly included (female) partners of (male) gamblers e.g. Jimenez-Murcia et al., (95), whereas CSOs are more broadly defined in the studies included in this thesis. The results from Study II indicates some differences in how much different groups of CSOs know about the gambling, which could be an indication that CSO involvement may vary as a function of type of relationship.

When asked directly what type of support CSOs need, several CSO participants in Study V highlighted the importance of receiving some sort of support to be able to set limits in relation to the problem gambler. CSOs that finished Study I, III or IV, gave the treatments very high ratings overall, and underscored the value both of being involved at all, but also of specific components such as psychoeducation about PG or communication training. However, CSO adherence in all three RCTs was rather low, and detailed analyzes of CSO participation in Study III revealed that the time spent online on each module was generally less than 30 minutes, while the recommendation was to spend about an hour on each module. A recent German feasibility study on online support for CSOs of problem gamblers showed similar results, and only 37% of participants completed the five treatment modules (134), further underscoring the challenges in retaining CSOs in online PG interventions.

9.6 DIFFERENCES OF PROBLEM GAMBLING IN COMPARISON WITH SUBSTANCE USE DISORDERS

PG research and treatment is generally modelled on findings from substance use disorders, assuming that the conditions are similar enough to be treated with the same approaches. While there are certainly similarities between PG and substance use disorders, there are, as previously mentioned, also substantial differences in symptoms, consequences and possibly also neurological mechanisms. This calls for some caution when transferring treatment protocols from substance use disorders to PG, in particular since PG is the only addiction disorder not involving any substance. There is also a risk that some important lessons learned from years of investigating a certain treatment approach for a specific condition becomes lost when the treatment is transferred to another condition.

For instance, research on CRAFT in other fields of addiction have generally involved quite extensive face-to-face treatments with a focus on role-playing, and set in clinics with readily available treatment for the substance abusing part (86). In PG trials, CRAFT interventions have instead been rather brief (83, 85, 135), which could have affected the results. Similarly, BCT trials in other addiction fields have all been conducted in a face-to-face setting. It could be argued that the change of diagnosis to be studied, as well as the change of treatment delivery method or intensity of treatment is one change too many. Furthermore, regular CBT treatments have robust research support for the treatment of PG (73), and has been the focus of PG intervention research for decades, while this is the first BCT trial in PG research. More

research, possibly in face-to-face settings, could provide a more thorough understanding of what role BCT can play in PG interventions.

9.7 THE PROCESS OF RECOVERY

Despite the inconclusive results regarding the effects of involving CSOs in PG treatments, the included studies also underline that recovery from PG is possible and realistic. Participants in both treatment conditions in Study I and IV substantially improved on PG and mental health outcomes with sustained results up to a year after treatment finish. But even those who had dropped out of the treatment early indicated in Study V, conducted 2-3 years after treatment initiation, that they were now free from PG, with the help of Gambling Free Together, other interventions, CSO support, changing life circumstances or sometimes without any particular effort at all. The question is not whether problem gamblers can be helped, nor whether health care professionals can help them, nor whether CSOs have a role to play in recovery, but how problem gamblers can best be supported.

10 CONCLUSIONS

The results from the included articles further deepen our understanding of PG, and how it could be treated. The results indicate that internet-delivered interventions for problem gamblers and CSO work well in the treatment of PG, even though many challenges remain. Furthermore, CSOs seem to have a fair understanding of PG, and may serve as important motivators for the gambler to seek and commence treatment. On the other hand, involving CSOs in PG treatment does not necessarily affect the outcome or adherence on part of the gambler. CSOs seem to benefit from internet based support, and their outcomes do not necessarily depend on the state of the problem gambler. Negative emotions, relapses, but also recovery, are important factors when problem gamblers drop out of treatment, and should be taken into account when designing interventions. Many problem gamblers try several different treatment options, and access various types of support. Various combinations of interventions, CSO support, and changing life circumstances might lead to recovery.

11 ACKNOWLEDGEMENTS

A thesis is not a one man's job, but rather the results of my efforts in combination with all the hard work, collaborations and support of a great number of people. I would like to especially thank:

My main supervisor **Clara Hellner**. I could not have wished for a better supervisor. Always supportive, analytical, ambitious, and full of ideas, but also very relaxed and down to earth. I hope we will collaborate on many projects in the future!

Per Carlbring, co-supervisor, whose enthusiasm, entrepreneurship, and experience from the gambling field, has been of great importance for this thesis. Thanks also for all the weird sweets and cookies!

Gerhard Andersson, co-supervisor, who has been on this trip all the way from Cape Town. Your extraordinary experience and energy has been very valuable for this project.

Kristoffer Magnusson, my main collaborator in these projects, without whose extraordinary talents in all things statistical or methodological this ride would have been much bumpier. And thank you also for all the non-work related good times.

Olivia Simonsson, who has more or less taught me what I know about qualitative research methods.

Hedvig Olin, **Christer Classon**, **Mikael Gewers**, **Chantella Love**, **Philip Lindner**, **Anja Näslund**, **Jonas Rafi**, **Maria Garke**, **Lisa Berg**, **Karin Brodin**; the therapists who worked on the projects in this thesis, a great thank you for all the effort you put in to the sometimes repetitive task of locating, treating and administering the participants in the study. These studies literally wouldn't have been anything without you.

Sara Holmqvist for chasing all these follow-up measures, sending all those tickets and forms. You have to come and see us (and your old flat) as soon as I get back!

Viktor Månsson for all the work collaboration, for all the video meetings, and for pretending to laugh at my jokes even if you've heard them ten times before. **Xiangwei Zhou** for outstanding help with everything related to our courses.

Håkan Wall and **Ingvar Rosendahl**, the backbones of the gambling group from Forum and beyond. Thanks for all the coffee, all the discussions and all the gossip.

For everyone in the gambling research group for great support, discussions and collaborations: **Maria Vinberg**, **Olof Molander**, **Lisa Runfors**, **Claes Rantil**, **Anne Berman**.

Johan Bjureberg and **Karolina Sörman** for all the lunches, gossip and good times!

The GamPubClub: **Jakob Jonsson**, **David Forsström**, **Kristina Sundqvist**, **Ekaterina Ivanova**, **Henrik Josephsson**, and several others already mentioned: you have really meant alot for my understanding of this field.

My half time review board: **David Hodgins**, **Anders Håkansson** and **David Mataix-Cols** for providing me with very valuable feedback half way through. Or as the half time reviews are also known: a possibility to steer the Titanic away from the iceberg.

My **mom** and **dad** for all the love and support, but also for really teaching me how to write well and how to think critically. It has really taken me where I am today. But I did not follow the advice "whatever you do kids, don't write a PhD".

My brother **Kalle Nilsson** and my sister **Lovisa Nilsson** for being two role models in life, as well as dear friends, and academic conversation partners.

Anna-Clara Hollander and **Håkan Johansson** for being not only in-laws, and good friends, but also PhD forerunners.

My parents-in-laws **Ann Belenius** and **Björn Svensson** for the immense help with babysitting, providing somewhere for me to stay in Stockholm, and for the support over these years.

Anna-Christina Ek, my step grandmother, for all discussions about scientific methods and conduct, and for starting the family tradition of entering, and staying in, academia.

Johannes Zackari, my main bromance, for all the support, love and extraordinarily fun times. 800° + Erlands.

The city of Ankara, my home for the past two years. What the city lacks in luster, **its inhabitants** – permanent and temporary alike – make up for many times over.

To my kids, **Greta** and **Nils**, who were both born during this process. You are the best things that ever happened to me. Even though you have little idea of what my job entails, you have contributed in a very concrete way by letting me take advantage of the generous, lengthy **Swedish parental leave**, thereby allowing time for all the follow-up measures to be collected.

To **Tessan**, my wife and eternal sunshine. You might sometimes feel guilty for dragging me to a grey town in the semi-dessert of inner Anatolia, but I wouldn't wanna have it any other way. Home is wherever I'm with you. I love you.

All the **participants** in the included studies. I sincerely hope you have benefitted from participating, and that your lives are brighter today.

Svenska Spels forskningsråd who generously provided me with funding for my PhD studies.

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