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The treatment of gambling disorder
A comprehensive (socio-psychological-neurobiological) explanation and therapy model?*

Meinolf Bachmann, Andrada Andrea Bachmann & Svenja Frensemeier
*We renounce a new peer-reviewing because this publication is a summary of not fundamentally modified peer reviewed studies.

Summary
In this theoretical work, we present the clinical picture of pathological gambling, an etiological explanatory model and resulting therapeutic implications. Social, psychological and physiological factors are included. The "addiction model" also distinguishes between factors relevant to the onset and continuation of disturbed gambling behavior. Multifactorial causes must be postulated in the "entry phase" of the behavior. During the actual "addiction phase", the self-perpetuating disturbed gambling behavior is characterized by a strong mental dependence and a nearly autonomously triggered addiction behavior (loss of control) associated with structural changes in the deeper brain areas of the „reward system". There is an "irresistible urge" to continue gambling, upheld not least by a dominance of gambling behavior in the reward system and the accompanying dysfunction of this area of the brain.
At the beginning of therapy, the focus lies on the addictive behavior itself. The symptoms that developed last are the ones that are first incorporated into the therapy consideration, whereby the therapeutic goals are to be set in a certain order: (a) Motivation, withdrawal symptoms after the patient stopped gambling, (b) insight into the disease (do not deny further) and its acceptance, (c) consolidation of the abstinence through a treatment of the causes of disease development. Dependence means not having sufficient alternatives. The reconstruction of the reward system and the development of a wide range of varied alternatives are an important prerequisite for avoiding relapse and achieving a balanced and satisfied way of life. Eliminating the dominance of gambling in the reward system and strongly anchoring the desired potently rewardable alternatives in behavior is associated with significant psychological and physiological resistance. The adrenaline rush of gambling is not easily compensated and cannot be replaced with lukewarm water or realistic thinking. Problems of implementing desired behavioral changes have not yet been sufficiently taken into account and there is a lack of necessary research. Are there any obligatory treatment factors?

Key words: gambling disorder, socio / psychological / neurobiological approach, addiction model, cognitive-behavioral therapeutic emphasis, reconstruction of reward system.

1. Introduction
It was especially for local reasons that I (first named author) moved my working place to another stationary addiction clinic of the civil service after two years. During the first few days, a colleague asked me in passing whether one should exchange views about his and my applied therapeutic approach. I could not even answer, because he changed his mind and said in leaving: "In the addiction area, everyone does what he wants." This phrase still "haunts" me after several decades of therapeutic work and research. Maybe that's why the summary ends with a somewhat provocative question.
From the beginning of gambling addiction therapy in 1985 (Bachmann & Bachmann, 2018), the appearance of the disease was in the foreground and it became clear that there was no alternative to a consistent orientation on the addiction model. Its theoretical design was to be understood and worked out even more clearly. Important suggestions came from the German practitioners and scientists Feuerlein, Kellermann and Böning as well as the »gambling addiction pioneers« Custer and Lesieur from the USA. The aim was to develop the basis for a differentiated addiction treatment while, at the same time, including the needs specific to gambling addiction.
To emphasize the complexity of the clinical picture (Albrecht-Sonnenschein & Gebhardt, 2018), an **integrative** therapeutical-model is needed:

- The chronological event of gambling addiction develops in the multi-layered interplay of **personal, social** as well as specific **gambling-related parameters**.
- The inconspicuous transitions of gambling behavior, from the first implementation through the **enjoyment** and **habituation** to **problematic** and finally **addictive**, pathological gambling, are determined by numerous, and possibly changing, characteristics.
- Individual theoretical approaches therefore provide no answer to the question of the causes of this addiction. Only integrative explanatory models do justice to the **complex processes of emerging and maintaining addictive** gambling behavior.

- The explanatory approach of an **integrative therapeutical-model**, which **includes the specific interrelationship**, provides useful indications for the most diverse therapy requirements and preventive measures.

In our **German inpatient treatment**, most pathological gamblers were admitted to a medium-term (about 8-12 weeks) “Weaning-Therapy”. As a rule, special facilities for gamblers in Germany have a wide-ranging multimodal treatment program (medical treatment, group therapy, individual therapy, family therapy, indication groups, occupational therapy or creative design, physical applications, sports and gymnastics, relaxation training, information sessions on addiction issues and general health issues). In detail, this is described in “Spielsucht” / “Gambling Addiction” (Bachmann, 2017a-e). However, this article focuses on some fundamental contents of therapy, not structural possibilities.
To date, there have been about 1500 gamblers in our treatment, most of them are male. Of these, **about 80-90% are slot machine gamblers**. Losses in this gambling form easily reach $ 300-400 per day, which is significantly increased due to the fact that gambling often takes place at several machines simultaneously. Assets are quickly "at stake". Sports betting and internet gambling are increasing strongly. The rest is distributed among others, on roulette, lottery and various card games. In 2002, the first **internet roulette gambler** came to the clinic for treatment (Hayer, Bachmann & Meyer, 2005). More than 50% of the gamblers in the clinic also suffered from a substance-related dependency. Until the end of the eighties, there still were intense arguments about whether gambling really is an independent disease. This discussion diminished considerably when pathological gambling was included as an impulse control disorder in the recognized diagnostic schemes DSM-3 and the ICD-10 of the WHO (Saß et al., 1996; Wittchen et al., 1989) and the ICD-10 of the WHO (Dilling et al., 1991).
By adding pathological gambling as the only behavioral addiction in the addiction chapter of the DSM-5 (2015), the dichotomy seems to be reversed to diagnose the disorder as an "impulse control disorder" and to treat it as an addiction, as we have done since 1985. It remains to be seen, however, whether the ICD-10 standards (F63.0: pathological gambling) also change in the direction of "addiction classification". Mann et al. (2013) emphasize that epidemiological and neuroscientific research has made an important contribution to its classification as a behavioral addiction. Thus, there are convincing **similarities between "substance-bound" and "non-substance-related addictions"** both in terms of **disease progression** (chronic recurrent course with higher prevalence among adolescents and young adults), **phenomenology** (positive substance or behavior enhancement effect, at least in the first stages of the disease), **disorder** (manifestation of subjective craving, tolerance development and withdrawal), **possible comorbidities**, **treatment history**, **genesis predisposition** and **neurobiological mechanisms**. The association of gambling with the neurobiological correlates come more and more into focus of attention.

2. Gamblers in treatment

The previous treatment approaches in gambling addiction therapy are predominantly cognitive-behavioral (CBT) oriented. We prefer an integrative approach with a cognitive behavioral therapeutic emphasis and added (Bachmann, 2000, 2004a, 2017a; Bachmann et al., 2015) addiction-specific factors that differ gradually rather than principally between patients:

- **different** conditional structures of the **emergence and maintaining** of the disorder,
- neurobiological characteristics of the “**reward system**”,
- more and more autonomously triggered addiction behavior and the **loss of control**,
- the **ambivalent motivation and lack of disease insight**,
- **absorption** of interests and **alternatives**,
- **relapse** risk.

In order to bring about needed neurobiological changes and to restore the functionality of the reward system, it is necessary to reconstruct and redesign the rewardable cognitive and behavioral alternatives (reduction of negative and generating positive emotional / affective[1] states). To ensure that abstinence

[1] emotion and affect are used synonymously

is not perceived as a renouncement but as an advantage in the long run, diverse social, psychological and health-promoting alternatives to gambling are to be built up. This is to replace addiction and significantly increase life satisfaction. In the sense of operant conditioning, new associations between gambling-triggering stimuli (e.g. mental stress, boredom) and addictive reactions (e.g. seeking a conversation, doing sport) have to be established and firmly anchor in the behavioral repertoire. The implemetation of these therapy goals will receive special attention. The adrenaline rush of gambling cannot be replaced by lukewarm water or realistic thinking.
To establish potently **rewardable alternatives in an ongoing stable manner**, a considerable amount of **effort** and **training** is required in order to overcome both psychological (e.g. fear of failure due to frequently experienced failures) and neurobiological (dominance of gambling in the rewad system) barriers.
Early on, we started developing materials for a comprehensive **therapy manual**, which we published in 2014 (Bachmann & El-Akhras). The modules of the therapy manual "Glücksspielfrei" („free of gambling“) are: theoretical overview, start of treatment, therapy overview, money as a topic, superstitious ideas about gambling, spending too much time on PC or Internet (role) gaming, relationships and social skills, showing feelings - "emotion box", stress reduction and relaxation techniques, relapse prevention, alternatives to addictive behavior, structure and activity plan, transition: conclusion of therapy and follow-up.
Instead of a completely open group approach, a structured and thorough **work on themes** was preferred, but without excluding the handling of conflicts and so-called "disturbances". By creating a good atmosphere, by conveying interest and joy in the group lessons, as well as by including the very effective and cooperative **work in small groups**, the goal of establishing the best possible learning conditions is achieved. In this way, patients can exchange important experiences on how to achieve abstinence from gambling, what sensations are to be dealt with, how to cope with acute withdrawal symptoms, to promote illness insight and acceptance, and how to consolidate the wish for abstinence. **Advanced patients are important role models** for new group members in dealing openly and unreservedly with the addiction issue and coping with the often massive feelings of shame and guilt caused by the harmful effects of gambling addiction. Both group therapy and additional individual and family therapeutic measures (Bachmann, 2004a, 2017a; Bachmann & El-Akhras, 2014) offer a variety of opportunities to see the multifactorial causes of disease development, to initiate necessary changes in attitudes and behaviors, to correct the handling of money, to expand alternatives to gambling, to achieve a lasting stabilization of the patient and a satisfied abstinence.
There is no question that a disease is always treated with the least possible personal and economic strain. However, this general principle does not make it easier for those affected and the practitioner to **choose the right individual treatment**. There are now about a dozen clinics in Germany that have developed special concepts for the treatment of pathological gamblers (Bachmann, 1989, 2000, 2004a; Custer et al., 1985; Kellermann, 1988; Lesieur & Blume, 1991; Schwarz & Lindner, 1990). As with other addictions, some of the pathological gamblers achieve abstinence from gambling with a self-help group and do not need professional help. Across the Federal Republic of Germany, groups of **Gamblers Anonymous** (GA) have formed in parallel with the Anonymous Alcoholics (Anonymous Gamblers, 1984; Meyer, 1989). Outpatient addiction counseling centers have founded their own gambler and relatives groups. Addiction therapy generally has to take place in close cooperation. The different "institutions" form a treatment network, which ensures, for example, the necessary preparation and application for inpatient stay as well as its important follow-up care. Arguments that speak for an early contact with an inpatient facility are: 1. local outpatient treatment options are not given, 2. outpatient treatment attempts have failed, 3. it is a "shelter" necessary because the social environment is too difficult, 4. there is strong mental or social distress.

2.1 The family of the gambler

The family members of pathological gamblers are involved in the disease process in different ways. On the one hand, circumstances of the **family environment contribute to the emergence and maintaining**

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of addictive gambling behavior. On the other hand, **family members are also affected by gambling addiction as "sufferers"**. A multitude of social, psychological and economic problems lead to high demands on the partners and children, as well as on the parents of gamblers. They are affected by many different emotional and behavioral problems (Bachmann, 2017d; Bachmann & El-Akhras, 2014).

The **children experienced heavy losses** of **security** and **trust, love as well as financial support**. Substantial needs of the children were neglected: Children blamed gambling for the separation or divorce of their parents. They felt that they were breaking up. The gambling parent had become a stranger to them, he does not like them anymore and has no time and interest in them. The gamblers did not care enough for them and would not talk to them about their worries and hardships. Gambling is more important to them, and the children did not know where they were or when they would come home. Instead, the **children themselves** would **have to take on a lot of responsibility**, for example to care for their younger siblings. In some families, children would receive no presents for Christmas, and there was not enough money for vacations or field trips. Clothes or the most basic food was missing, so that they would have to go to bed hungry. Their home, the house, everything was lost through gambling (Bachmann, 2004b; Darbyshire et al., 2001).
After a study (survey questionnaire in a U.S. "Gamblers Anonymous" self-help group meeting) from Lorenz and Shuttlesworth (1983; cf. Lorenz & Yaffee, 1988), most gambler wives reported a relatively normal childhood, but 19% grew up in families with gambling or obsessive-compulsive disorder. Another 9% experienced other mental disorders, 17% experienced longer periods of separation, and many ended up in divorce. On average, the **wives were 22 years old when they married the gambler**, with about 60% saying that the **husbands were compulsively involved in gambling by that time**, but they had largely misjudged the importance and severity of the problem. But after two years of marriage, over 80% of wives were aware of how massive the man's problems were. 84% of the **gambler women described themselves as emotionally ill as a result of their experiences with the pathological gambler**. They sought refuge in excessive drinking, smoking, overeating and hunger or impulsive shopping. In 43% of the cases, there had been **emotional, verbal and physical abuse**. More than half of the women reported that the gamblers lost interest in sexuality during the time of active gambling. 78% of women had already threatened with separation or divorce, but 94% of respondents continued to live with their partner. 12% of the gambler spouses committed suicide attempts (total suicide rate: 12.7 per 100,000), partly because of physical and verbal abuse and arguments over separation and divorce.

Against this background, the **involvement of the family in the therapy process** seems not only plausible, but **absolutely necessary**. This includes the following measures: separate conversations with the partner (with the explicit consent of the patient), to which the gambler is added later, couple talks and seminars, family discussions or therapy involving the children. Studies show that children of addicted parents also have a higher risk of developing a dependency disorder. A case study of an inpatient treatment family therapy (male gambler, daughter and son) was documented (Bachmann, 2004a). In addition, children and parents of gambling addicts may be more likely to seek **further therapeutic help outside addiction treatment**.

3. The addiction model and the therapeutic conclusions

The therapy goals of **outpatient and inpatient facilities** differ only gradually. In outpatient treatment (Düffort, 1989; Füchtenschnieder, 1994), it is more difficult to bring the gambler to a continuous acceptance of help, keeping in contact with them and helping them achieve the goal of abstinence in the real life situation with the numerous addiction triggers available there. In inpatient treatment, some steps are done before. The relatives should be involved as early as possible, which contributes significantly to the success and upholding of the therapy results. Looking at the **addiction model**, the previous **theoretical considerations can be integrated**. It differentiates between **entry** and **addiction** phase. Here, the conditions of **emergence** (entry phase) and **maintenance** (addiction phase) as well as therapeutical conclusions are included (figs. 1 and 2). The addiction model (see fig. 1) differentiates between entry and addiction phase.

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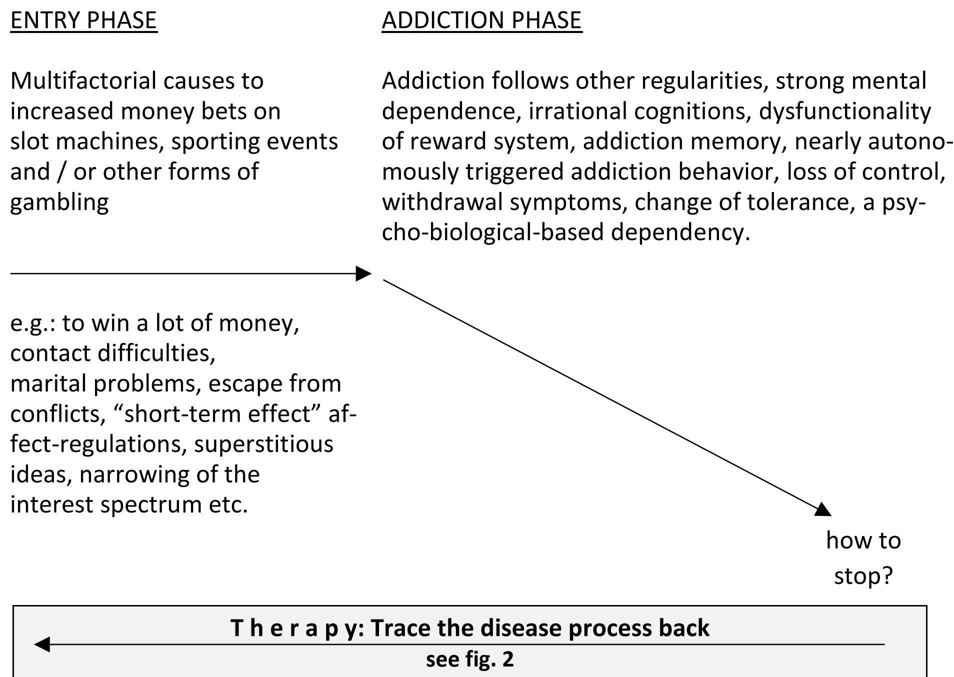

Figure 1: Addiction model (Bachmann, 2017a)

3.1 Phase of entry

Observations show that there are **multifactorial causes** that lead to a start and an increased interest in gambling. Part of this is to win a lot of money with little effort. Early on, an irrational assessment (cognition) may be added – for example: to have special abilities or luck in specific forms of gambling. It is the "**thrill**" (drug-like) effect of gambling, which is caused not only by the **profit outlook**, but also by a threatening **economic loss of livelihood**. Intensive gambling distracts, often in a very "**short-term effect"**, from pressing problems and promotes an escape from conflicts. During gambling, psychic stress is switched off, and potential deficits in coping strategies, self-confidence and social skills are no longer perceived so consciously. In the rush of gambling, even omnipotent feelings may arise.
Easily available, easy entry: In recent years, more and more patients who have participated in gambling on the Internet have come to the counseling centers and clinics. These are primarily "typical" casino gambling forms with high frequency events (gambling sequence) such as roulette, blackjack, poker, but also live betting and lotteries, which are characterized by a highly addictive potential (Hayer, Bachmann & Meyer, 2005; Meyer & Bachmann, 2005). For some gamblers in the clinic, the first online gambling attempts were so lossy that they returned in shock to their original gambling style and even took the event as an opportunity to decide starting a treatment. Even in the entry phase, **significant** behavioral **problems can occur**. The "**problem gambler**" will spend a lot more money during gambling than his financial situation would allow. The gambler exceeds a time frame and, at first, duties are neglected. At this stage, therapeutic efforts, such as the treatment of neurotic disorders, are aimed at understanding and working on the causes of gambling and developing alternative behaviors to it. Not every deviant gambling of chance can be described as addictive. In order to **avoid further endangering** and because a complete renouncement of gambling is easier to realize than a "controlled" handling, abstinence should already be appropriate for this problematic gambler.

3.2 Phase of addiction

In the addiction phase, the gambling behavior is characterized by a **strong mental dependency** and a **dysfunctionality of the reward system** (a psycho-biological-based dependency). It is to be assumed that an interrelationship between these factors causes the "loss of control" (or "inability to abstain"). The gambling has developed a strong „own dynamic" in form of a nearly autonomous (cognitively-biologi-

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cally conditioned) reaction, which is characterized by the sloping line in fig 1. The gambler **phenomenologically** feels **an irresistible urge or "internal pressure"** to continue gambling. Even very negative consequences, significant economic, social and psychological disadvantages can not stop the gambling, which often makes it even worse. Professional and domestic duties, other interests and behaviors that have hitherto determined the purpose of life and have contributed to relaxation and mental balance, are severely neglected. The gambler is thus more and more fixated on the gambling behavior and relies on it. As with drugs, a tolerance change occurs, the dependent gambler must increase the "dose" to achieve the expected mental effect. The result is a dependence, which is characterized by **feelings and emotions, such as joy, hope, disappointment, anger, etc.** (otherwise related with other events in the family, professional and recreational life) that are **gradually almost exclusively associated** (conditioned) **with gambling**. Gambling becomes the central purpose of life. Different signals such as sounds and lights that accompanied the gambling have trigger function for his emotions. The addict feels empty, bored and restless, if he cannot gamble.
Withdrawal-like symptoms, such as severe nervousness, sweating and even heart problems occur. The great threat to livelihood by gambling causes a high degree of excitement and arousal. As a result, the signals and sensations associated with the course of gambling are very strongly conditioned and difficult to resolve. Despite the increasingly pressing negative social and psychological consequences, an often existing increasing risk of suicide and delinquence, addiction-specific defensive attitudes are active that lead to feelings of shame and guilt and a rejection and trivialization of gambling problems. Often, it is through massive intervention by others that it becomes possible to break this vicious circle. Distorted cognitions also mean that the way out of the threatening situation is still seen in a “quick big win” or a winning series and the hope remains to have more luck or skills than others, or to be able to outsmart coincidence. The bigger the debt mountain has become, the less the gambler seems cognitively and emotionally able to give up, finally accept the losses, and stop chasing them.

4. Therapeutic conclusions

In **addiction therapy**, the symptoms that developed last are the ones that must be treated first. That means, **trace the disease process back** (see fig. 2).

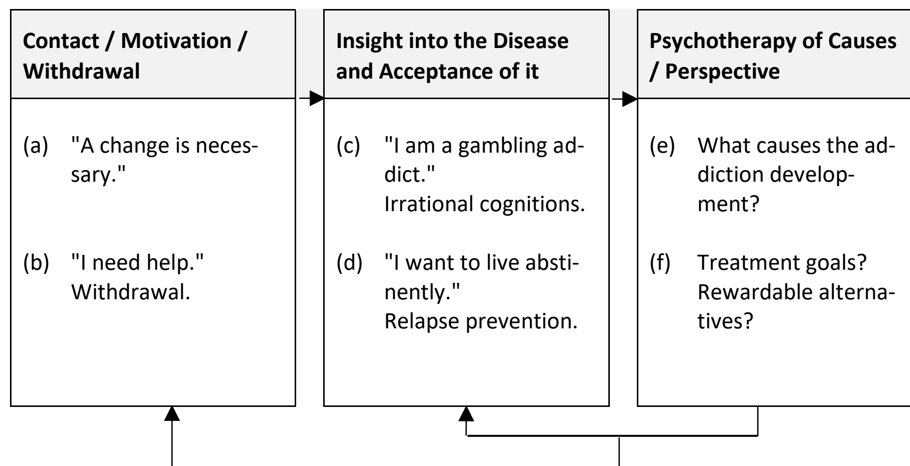

Figure 2: Therapy steps and questions (Bachmann, 2017a)

This is described in fig. 1 as "Trace the disease process back". In order to stop the addictive behavior, the gambler first needs support to accept help, to make contact with a self-help group or addiction counseling center. He has given up the illusion of dealing with the problem by himself. Here, relatives can often take the first step by looking for help and doing something for themselves, talking regularly and thus changing the intra-familial "system" and influencing the addict's behavior towards therapy. The next step would be to avoid addictive behavior (see fig. 2). In order to **stop gambling**, it is necessary to have

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temporary management of money, a ruthless record of indebtedness, self-control methods and development of rewardable alternatives to gambling. In inpatient therapy, this step is usually easier because of the protection offered by the clinic and the extensive therapeutic setting. Next is the **motivation to promote a comprehensive change**. A growing **acceptance of illness** consolidates abstinence at first, while the subsequent **analysis of the original causes** of the disease development, **constructive alternatives** and **relapse prevention** ensure a lasting stabilization. Thus, the patient does not return to the starting point of the disease development. In achieving the therapeutic goals, a certain order must be kept. It does make little sense to work with the patient on the causes of his illness, if he still refuses the treatment for himself or shows insufficient disease insight. The lower arrows in fig. 2 (see above) indicate that the **therapy is a longer-term process** in which the individual steps must be repeatedly reviewed and deepened. In addition to the explanation of the individual treatment, steps are illustrated in the following sections by way of example.

In order to provide patients with an overview of the connections between the addiction model and the therapeutic conclusions, the German-language (translation is planned) worksheets (“Glücksspielfrei”, “free of gambling”, Bachmann & El-Akhras, 2014) "Stages of Addiction Development and Therapy Process", the self-assessment scales "Therapy Motivation" (TMO), "Disease Insight / Abstinence "(KE) and "Therapy of Causes" (TdU) are developed. The materials are used in group and individual therapy procedures and are applicable in both outpatient and inpatient settings. The scales serve to ensure an intensive examination of the therapeutic issues and to make progress and changes visible in the course of the therapy process. Depending on the duration of the therapy, multiple assessments are possible.

4.1 Motivation

Often, it was the imminent or already pronounced divorce, the feared loss of employment, the announcement of relatives that unless the gambler was going to change their behavior, they would have to leave their parents’ home, or a threatened report to the police for illegal fundraising, until finally the impetus for consent to therapy was given. Prochaska et al. (1992) divide the process of change into five phases: 1. Pre-contemplation – the slightest insight and willingness to change; 2. Contemplation - willing to talk about problems, to think about them, but not to take practical action; 3. Preparation - wanting change, seeking help; 4. Get active - decide on changes and start changing circumstances; 5. Maintaining - to continue changing processes. Care must be taken to ensure that the therapist and the patient are on the same level of conversation. The motivation of the pathological gambler **is not to be regarded as a static condition. Rather, the process is often highly ambivalent with many ups and downs**. Most of the times, it is a difficult way from extrinsic to intrinsic motivation but the desire to stop gambling is sufficient to start a treatment. In order to **counteract fluctuations** in treatment offers, it is desirable to contact relatives or other supporting people as soon as possible and to include them in the therapy. With the following exemplary questions, the existing motivation can be checked and promoted (see fig. 2 above):

(a) "**A change is necessary**": Do you suffer from your gambling behavior? Were there treatment attempts? What was the trigger for starting a therapy? What do you expect from the therapy? Do you wish to stop gambling? Has gambling harmed closely-related people? Do others find it important that you start a therapy? Has anyone pushed you to therapy? Do your family and employer support you?

(b) "**I need help**": Can you stop your gambling behavior by yourself? How do you know that you need help? How have your own attempts to stop gambling failed? Is it possible to include your relatives or caregivers in the treatment? Were there circumstances in the past that have temporarily contributed to a decline in the frequency of gambling or an abstinence phase? Can we build on this successfully?

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4.2 Disease insight and abstinence

Especially when a recovery process is successfully initiated, the continued acceptance of the addiction disease ensures the necessary readiness, alertness and caution not to start gambling again. Experience shows that addicted gamblers are unable to return to so-called "controlled gambling." Relapse analyses make it clear that even after years of abstinence, even smaller stakes are sufficient to reactivate the entire clinical picture within a very short time. The player's insight that something is wrong with his gambling habits can often date back several years without him making progress in treatment motivation. Doubts and comparisons, "others play much worse, I already have the situation under control", often wipe out the good intention of wanting to stop gambling. The **addiction is accompanied by irrational thoughts** and ideas which must be questioned and changed (cognitive restructuring).
It seems to be especially difficult to **give up the belief of being an expert** in gambling. The gambling machines, on which winning is an entirely or, at least, highly random event, very cleverly deceive gamblers into thinking that they have acquired skills while gambling with which they can cheat “destiny” or influence their happiness.
They follow the gambling behavior with such intensity that it is hard to believe that they did not learn anything. Such an assumption seems to contradict human nature. That's the reason why sometimes it takes weeks or even months until irrational thoughts abate or are given up.
In addition, “unrealistic cognitions” mean that the **gambler still thinks that his way out of the threatening situation lies in a quick big win** or a winning series, and the hope remains to have more luck or skills than others or in outsmarting / defeating slot machines in the end.
The bigger the debt mountain has become, the less the gambler seems cognitively and emotionally able to give up, capitulate, finally accept the losses and stop chasing them. One of the most persistent and fateful beliefs is to keep gambling to recover the losses.

The superstitious world of thoughts is an important factor for maintaining addictive behavior. An open debate about illusions and false hopes, in a non-hurtful, but empathetic form is necessary. From the initial phase to the addiction phase, the irrational beliefs continue to deepen and consolidate and must therefore be included in the therapy process at an early stage.
Using scale estimations from the manual "free of gambling" (Bachmann & El-Akhras, 2014), each cognition from 1-8 (see below) is assessed. Then, a reflection and a disputation take place. This also makes changes or progress in the therapy measurable.
Between the assessments, three phases are distinguished: "meaning of this statement in the gambling phase", "in the course of therapy" and "the meaning of this statement in the now".

Irrational cognitions:

1. I can earn money with gambling.
2. I have lost so much, now the profit will come.
3. I have to gamble to recover the losses.
4. I can outsmart and defeat coincidence or the apparatus.
5. I can handle a particular device or gamble-form very well.
6. The idea of being able to anticipate big profits (»Today is a lucky day«).
7. Special methods ("press" or "gambling systems") are used.
8. I can free myself from my bad situation only through a larger profit.

The patients realize that behaviors that **seem strange to them**, such as denying the extent of gambling, deceiving others, lying to them, and raising money in a way**,** against their own values and moral, **are symptoms of illness and consequences of loss of control**. It is **one of the most problematic symptoms of the addiction**. Even after a short abstinence, immediate disease symptoms are no longer present, nothing "hurts" anymore and thus the acceptance of the disease diminishes or is lost. There is renewed doubt as to whether it is still necessary to completely abandon the addictive behavior. The durable visit of self-help groups is most likely one of the most helpful ways of counteracting this development.

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The working definition for abstinence is: The gambler gives up all cash and slot machine gambling (for example, also poker machines for points). For the difficult time of weaning, he also renounces all gaming with impact patterns similar to gambling, so as not to provoke a relapse. Exemplary questions with which the insight into illness and the desire for abstinence can be examined and promoted are (see fig. 2 above):

(c) "**I am a gambling addict**": Have you lost control of gambling? What dimension did your gambling behavior reach? When and in which situations do you gamble (in the morning, in the evening, throughout the day)? What was your stake (per day / week / month)? Which gambling of chance did you participate in? Were there superstitious ideas (techniques of pressing, selection of certain devices) to outsmart coincidence? Did you think you acquired special skills, tricks or a certain system? Do you gamble secretly? Do you feel caught by others when you gamble? Have you ever been blamed by others for your gambling behavior (e.g. wife, children, employer and friends)? Did you have withdrawal symptoms? Do you often have to think about gambling, if so, in which situations? Do you have physical ailments due to lack of nutrition, high coffee and nicotine abuse? Has your personal environment changed? What impact does gambling have on the family, the job? Have you made money illegally? Were there offenses for raising money? Are you in debt? Can you accept yourself as a gambling addict?

(d) "**I want to live abstinently**": Relapse prevention? What does abstinence mean to you? Can you imagine living off-limits in the long run? Do you want to change certain habits (e.g. excessive video, television, computer games) so as not to provoke a relapse? What were previous relapse triggers and how can you avoid these risks in the future? Do you want to visit a self-help group to be aware that relapse danger continues despite abstinence?

4.3 Psychotherapy of the causes from the entry phase of the disease

The next step is to address the underlying causes of disease development (e.g. contact problems, low self-esteem, lack of self-confidence or intrapsychic childhood conflicts), so that the gambler does **not return to the starting point of the gambling problem** and does **not provoke a new disease outbreak**. As with other addiction diseases, very vague hypotheses exist about what causes gambling addiction in the entry phase. Which reasons are responsible for the fact that someone gambled more intensively and thereby got into a dependency which follows its own laws (loss of control, own dynamic)? So far, no causal connections between personality disorders, biographical peculiarities and the genesis of pathological gambling can be generally established. Rather, it can be assumed that the causes of the disease are **multifactorial**, and that determinants of the **social environment** (e.g. access to gambling, peer group, family biography) **and** of the **individual** (e.g. lack of coping strategies, contact problems) are to be included in a treatment strategy. It should be self-evident that **careful social-anamnestic, clinical-psychological exploration and diagnosis should be** applied in order to support the patient in analyzing his own reasons for gambling.

"In the end, I could not look in the mirror anymore." The question remains as to whether self-esteem (Petry, 1996) was affected before addiction or as a result of it. One of the biggest problems in epidemiological research is that it can not yet sufficiently distinguish between causes and consequences of psychological disorders. It will be the same for the hypothesis about deficits in coping strategies and personality tests, which showed that gamblers are more emotionally disturbed and more spontaneous. Example questions to the cause research and processing are (see fig 2 above):

(e) "**What causes the addiction development?":** What do you have to do differently in the future without gambling? Was it your intention to make a lot of money with gambling? Did you expect to have special gambling skills? Have you used gambling increasingly to better cope with stress and strain situations (family, professional), to numb and ease them? How would you describe your own emotional state when you gamble? Do you want to increase your ability to talk about stressful emotions and deal with conflicts? Would you like to become socially competent and how can this be practiced? Did you have a special experience that made you gamble harder? Are there things in your life

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that you have not been able to talk about yet and that you have not processed? Are there behavioral changes, new interests and hobbies that could help to greatly reduce the importance of gambling as a whole? Is it important for you (as opposed to gambling) to address your needs and concerns openly and manage conflicts better? Co-dependency? Gambling consequences for spouse, parents and children? Gambling history in the family?

(f) **Treatment goals? Rewardable alternatives?**: Which specific personality traits, behaviors, values and living conditions need to be changed in order to ensure a permanent avoidance of the addictive behavior? What awaits you after the therapy in terms of partnership, home, workplace, friends and acquaintances? Are further partner discussions, family therapy measures necessary? Vocational rehabilitation? How is the further handling of money, debts? Are there enough positively effective alternatives to experience abstinence as an advantage?

5. Structural change of the reward system – build-up of an addiction memory

Consistent research results (Grüsser & Wölfling, 2003; Lindenmeyer, 2004) show that gambling addiction, as a result of a learning process, is characterized by a permanent neurostructural change of the brain. Above all, this approach emphasizes the "**rewarding" effect of an addictive behavior** and the related learning experiences, e.g. to have more self-confidence, to **be in a good mood** (= positive reinforcement), but also to eliminate or **alleviate unpleasant emotional states**, distract oneself from worries, conflicts, depressive moods and fears (= negative reinforcement). Because of these positive consequences in both cases, gambling increases: "**While gambling, I feel better**" (Elsesser & Sartory, 2001; Grüsser et al., 2002). The drug-like effect of gambling (like substance addiction) is to be in a **better emotional state at very short term** (“If the slot-machine runs, I don´t think about anything else”).
But what causes these rewarding effects? Psychologically active substances (alcohol, drugs) and excessive gambling influence the messenger substance balance of the brain. The endogenous "feel-good hormones" are active in a small but very significant part of the brain: the reward system. A **complex interplay of psychological** (conditioning / cognitive processes) **and neurobiological factors** such as certain messenger substances (**neurotransmitters such as dopamine, serotonin**) and behavior modulating substances (e.g. **endorphins**) is assumed (Böning & Albrecht-Sonnenschein, 2018). The reward system controls the emotional state of the person, rewards them with good mood and drive in the accomplishment of daily tasks. The reward system is the seat of feelings of pleasure or discomfort. In case of failure of this system, we would have no more desires, not even food intake or sexuality. Through continued and regular gambling**, fundamental structural changes** take place **in the brain** as **well-being becomes more and more dependent on gambling**. One speaks in this context of the **addiction memory**. It remembers in which situation, environment, emotional states etc. (things that are associated / conditioned to the addictive behavior) gambling had a certain pleasant effect (Böning & Grüsser-Sinopoli, 2008). When the addiction memory is activated, a nearly autonomous gambling reaction ensues. At the same time, positive gambling reactions come to the foreground and unwanted side effects are hidden (Lindenmeyer, 2005). It is assumed that the **addiction memory** (even after a long time of abstinence) **is not deleted and remains activatable**. In certain situations, it will trigger a strong desire ("craving") for the addictive behavior and initiate a relapse “at lightning speed”.
However, assuming a persistent addiction memory, relapse prevention (see section 7) must be added to build up rewardable alternatives. In personally relevant relapse risk situations, it must be learnd to control the automatically activating tendency of the addictive behavior. Since such sensitization of the reward system has subliminal perceptual and memory effects, the gambler sometimes does not know why he repeatedly carries out his problematic behavior. Often, he can not understand himself if he relapses after a long abstinence, even though he has long since recognized the harmfulness of this action.

6. Alternatives - reconstruction of the reward system

How is it possible to activate the reward system in other ways or to reduce the importance of gambling again? Other pleasant behaviors (“positive effective alternatives”), such as e.g. experiencing success in school / work, "good" conversations, satisfying relationships, exercise, sports, functional problemsolving and stress management, coping strategies, naming and expressing one's own feelings, listening to music,

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making music, dancing, singing, acting etc. can stimulate the reward circuit. Of course, **individual inclinations and needs** have to be considered. The way out of dependency means to have interest and pleasure again in many other aspects of life. Good intentions have to be put into action to build alternative behaviors, to replace the rewarding effects of addictive behavior with the effects of other positive behaviors and to "overwrite" (or cover over) the addiction memory and **end the dominance of gambling in the reward system**. The latter is based on the assumption that the addiction memory is not deleted but inactivated and relapse danger is not eliminated, as is unfortunately constantly confirmed in the therapeutic work. This is symbolic illustrated in fig. 3.

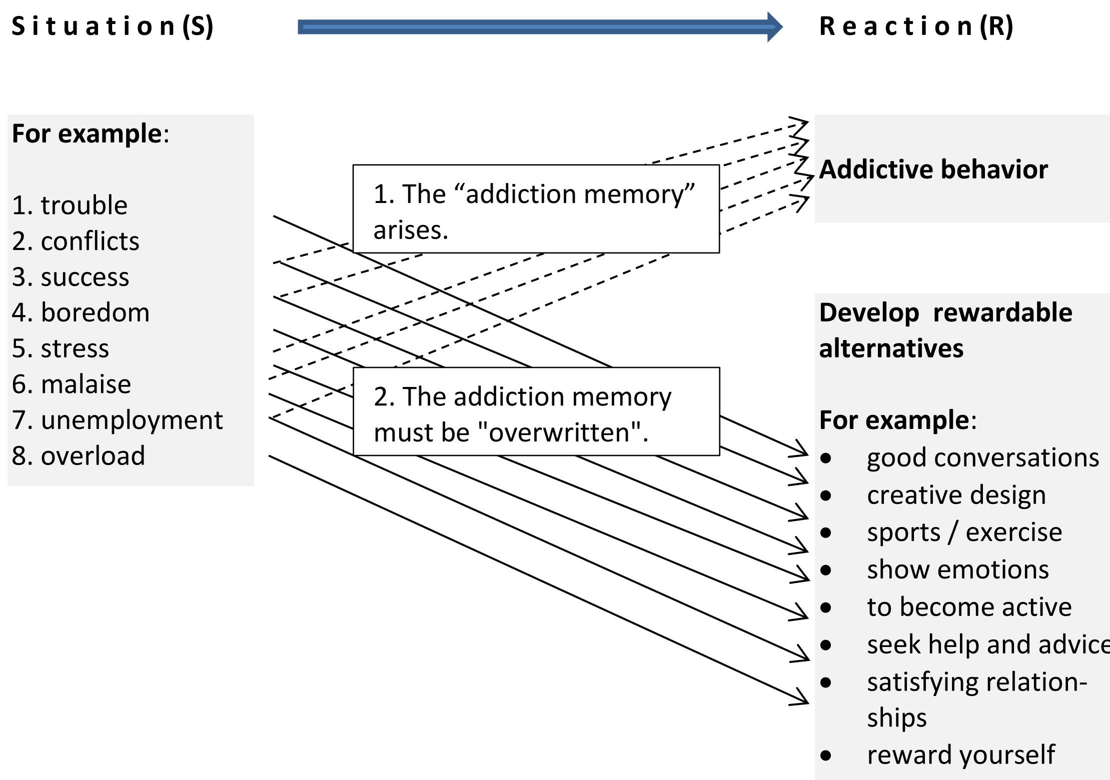

Figure 3: Development of rewardable alternative behaviors and "overwriting" the addiction memory - symbolic illustration - (Bachmann, 2017a).

By developing rewardable alternatives, it is possible to change the processes in the brain in the long term, without constantly experiencing abstinence as an unpleasant relinquishment. A general rule is that the best way to relax and have a "time out" is to focus strongly on something that has high positive consequences (e.g. moderate sporting competition).

Another question is **how much effort is required to prevent a nearly reflexive reaction** (internal or external stress-inducing stimuli) and to develop the possibility for an alternative reaction? In order to achieve these objectives, the potential to constructively overcome individually difficult situations – the coping strategies - should be improved. Both beneficial short-term and long-term effective methods have to be established. In the **first** strategy, **quickly down-regulate the negative affects** (e.g. reduce the excitement in a conflict) and **second**, **improve the situation substantially** (e.g. eliminate the causes for conflict). It is unlikely that all quick but short-term coping strategies have the same potential to destructively become dependent.
By formulating alternatives to formerly strong beliefs, and by generating new habits (e.g. regular fitness training), as well as the initiation of actions, exercise and positive experiences, open the opportunity to

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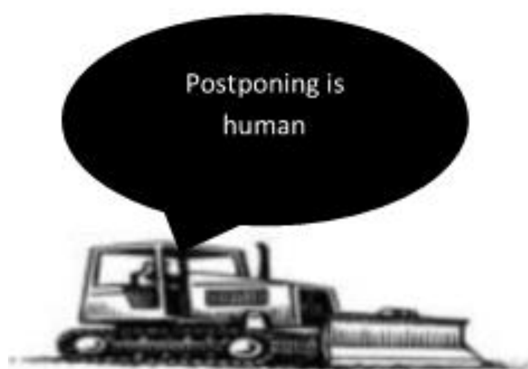
maintaining an inner psychological balance to increase the general well-being. Not the renunciation is in the foreground of the therapy but the positive effective alternatives.
It is plausible that frequent repetition and regularity are prerequisites to supersede dominant dysfunctional behaviors and firmly establish alternatives in the reward system.

Here is a little experiment: If you repeatedly say: "I do not eat an orange," most people find that even with the "negative wording", the usual salivation is set in motion. It is better to think of something else that arouses positive expectations and can actually be realized!

6.1 Realize therapeutic goals, postponement behavior (procrastination)
How often do **good intentions fail**, be it a visit to the gym or to optimize nutritional behavior. There does not have to be a psychological disorder to put ourselves in this position. Nonetheless, outsiders often completely lack the understanding, "why does the gambler not simply give up the self-harming behavior?" The neurobiological structural change in the reward system, which leads to a monistic behavioral preference, is a significant explanation for the problems of not achieving desired behavioral modifications. **Postponement may be a reaction to the presence of both psychological** (e.g. low self-esteem) **and the described neurobiological resistances** (**dominance of certain behaviors in the reward system**). In order to improve the feasibility of goals, it is not crucial to first change the attitude towards the set goals and to expect that this will result in an automatic implementation of the desired behavior. But rather, it is the other way around: An implementation of the **behavioral change in small steps** and the associated **first experiences of success lead to a change of attitude** ("this is actually fun, it is not that bad") and an **increased self-confidence to realize the set goal as a whole**. Gradually, successful actions generate realistic positive thinking, self-esteem and vice versa. Not only the clientele seems "top-heavy" (much PC-employment - hardly any movement, which can go as far as a stunted psychomotricity) but also the therapeutic approach, in which cognitive changes are not adequately supported or underpinned by „a stable behavior basis". The other way ("if I think long enough, the behavior changes"), seems to be much less succesful.



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Thus, success happens **more** in the sense **of bottom-up rather than top-down** (Rist et al., 2006). Therapeutic efforts are therefore aimed at developing concrete realistic plans, implementing the desired behavior, **with a lot of of social contact and support**, structuring the daily routine in a meaningful way and providing balance and relaxation every day. Thereby, "**highlights**" have to be planned, so that the "gray everyday life" does not find its way in and the question arises: "What am I allowed to do at all?" The way does not go "where it hurts" but where it comes from personal initiative and good foresight to a good balance between duties and an interesting, varied day and week. **Adrenaline rushes and adventures are to be had in a healthy way**, for example by means of moderate athletic competition / exercise, exciting excursions and other ways to overcome the “sofa / couch” behavior! A well-balanced lifestyle is the best

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guarantee for reducing the risk of relapse. In order to verify existing hypotheses, a study is in work to investigate **monistic vs. diverse rewarding interests** and activities among different groups (addicts / other disorder groups / control group) and correlation to e.g. life satisfaction and depression.

7. Relapse danger remains

Since addiction memory persists, there is a risk of relapse, regardless of the **progress in therapy.** Especially a short time after treatment, the greatest uncertainty exists in the **transfer** of what has been learned **to the real life** situation. Much of the research in addiction therapy focuses on **relapse prevention**. First, it may be uncomfortable for the patient ("not thinking of such things") to handle this question. There are various "models" and scientific findings on how relapse arises and how it can be prevented (Bachmann, 2017e; Körkel & Schindler, 2003; Lindenmeyer, 2001; Marlatt, 1985; Meyer & Bachmann, 2005). There are hardly any differences between the forms of addiction. The **causes** can be many and **varied**, ranging from "**carelessness**", due to a **lacking or diminishing illness insight** / **alertness**, to **difficult "problem situations**". It is the task of relapse prevention to recognize personal danger situations and to develop appropriate coping strategies. For this purpose, manualized working materials (Bachmann & El-Akhras, 2014) are also available, which deal with personal risk of relapse and coping resources in the form of assessment scales. Another question is whether **abstinence continues to be perceived as an advantage** with sufficient rewardable alternatives. An intensive examination of these topics is to be made. An "emergency card" that the patient carries with him to react (e.g. personal coping strategies, telephone numbers) in the event of an immediate risk of relapse. Once the critical situation is stopped, the next step is to assess and clarify the causes and how to avoid similar risk situations in the future.

An open, guilt-free **examination of a recurrent relapse** and the timely use of help (e.g. addiction counseling center, self-help group, insider relatives / friends, psychotherapist / family doctor) counteract a deepening of gambling behavior. Under these conditions, important learning processes to **consolidate the desire for abstinence are possible** and overall, **progress is often more likely than a step backwards**. A varied way of life, a constructive approach to stress as well as an alertness to "seemingly" harmless decisions (e.g. to carry too much money, to be with former gamblemates) as well as openness and assistance after a short-term relapse, are strategies **not to fall back into former addiction behavior**.

Intrapsychic or interpersonal conflicts, insufficient alternatives, as well as the desire to risk a new "controlled" gambling attempt, are important triggers for relapse. Taking into account a person's individual characteristics, the following risks of relapse can be named without claiming to be exhaustive (Bachmann, 2017e):

- Lack of illness insight / alertness.
- Control attempts ("a small stake does not hurt").
- Unbalanced lifestyle (e.g. family, occupational burdens).
- Negative emotional state.
- Low, one-sided interest spectrum and lack of alternatives to addiction.
- Boredom, lack of challenges and activities that satisfy a "healthy" risk behavior and need for variety "adventure" (e.g. moderate sporting competitions).
- Missing day structure.
- Irrational cognitions: misinterpreting randomness / gaining optimism.
- Comorbidity (neuroses, psychoses, dependencies).
- Unfavorable coping strategies (e.g. lack of conflict management).
- Lack of stress management.
- Degree of impulsiveness (needs and wishes can not be deferred).
- Sensation seeking (excessive need for arousal, pleasure).
- Seemingly insignificant decisions (e.g. drinking coffee in the gambling hall).
- Intensive preoccupation with money (debts, consumer wishes).
- Need to raise money.
- Availability of higher amounts of cash.

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- Conditioning of internal and external stimuli with gambling.
- Availability of gambling.
- Gambling behavior in the family and the social environment.

Relapse should generally not be a taboo subject in therapy. Behavioral **strategies after a possible first relapse** are to be discussed preventively. The regular visit of self-help groups, especially after outpatient or inpatient therapy measures, represents important relapse prevention and ensures that the necessary vigilance and disease acceptance are maintained. At this point, relapse research can contribute important conclusions for the realization and stabilization of abstinence.
Koch et al. (2016) describe **qualitatively raised strategies for coping with relapsing-risk** situations in a catamnesis - based on this:

• Looking for a positive distraction - in the form of alternative actions (e.g. expressing one self, being physically active).
• Not losing social support (just do not lie again, talk openly, do not be ashamed or feel guilty – family members know that relapse hazards are not excluded and are manageable).
• Money handling strategies (limit cash / card availability).
• Imagining negative consequences (not giving up the quality of life, "being able to look in the mirror", positive things that are otherwise lost, not standing in front of a "pile of shards" again).
• Desire is manageable (not afraid of emerging gambling demands, this situation does not force you to gamble - "not today!").
• No resignation or helplessness (even if the situation is difficult, fighting for something positive - doing things that are fun, riding the bike / after only a few miles, the pressure will decrease, to overcome the desire, what helped last time?).
• Do not forget aftercare ("I tell the group about the difficult situation, inform the therapist about it or even call someone from the support group directly").
• Respect social commitments (think of children, partner, do not endanger positive development).

Success measurement / catamnesis: In a study of nine published German catamneses for the inpatient treatment of pathological gamblers, Petry (2001) confirms the one-third rule of thumb from alcoholism treatment: According to it, treatment leads to complete abstinence in one third, another third shows improvement, and the last third proves to be unchanged. In recent German surveys, 1-year follow-ups (Koch et al., 2015, 2016; Premper et al., 2014) roughly confirm this "rule" (success rate around 57-71%). Long-term studies (Bachmann, 2017c; Hartmann, 2005) from alcoholism research indicate that the hope that a part of the addicted person can again maintain improved or controlled consumption is probably an illusion. In longer catamnestic periods, the “**controlled consumption**” group splits up in one of the other group’s **abstinence** or (stronger) **relapsed.** From this perspective, it can be concluded that **one-year catamneses** do **not yet reflect a realistic picture** of therapy success.

8. Addiction formula – relationship between illness-genesis and therapy

The addiction formula (see fig. 4. Bachmann, 2017a), includes (a) the emergence / maintenance (entry phase, loss of control) of gambling addiction and (b) the basic therapeutic implications (motivation, illness insight, treatment of causes, alternatives, relapse prevention). Figure 4 integrates the explantion of genesis (fig. 1) and therapeutical approach (fig. 2). The factors "alternatives" and "relapse prevention" have been added here as separate areas because of their growing importance. Especially from relapse research and neurobiological examinations using computer tomography, a lot of evidence has been collected to support this model (Bachmann, 2017a; Böning & Albrecht-Sonnenschein, 2018). Many of the results of gambling studies can be classified in it. The multiplication sign means that all factors, including the connection between addiction genesis and therapy, should be (obligatorily?) integrated into the treatment. The therapeutic approach described here and in all illustrations (1-4, sometimes slightly modified), is also applied to substance-bound addiction therapies and formulated accordingly (Bachmann & El-Akhras, 2014a).

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Addiction genesis (a)	=	Entry phase	X	Addiction phase						
		Antecedent conditions? Psychological, social, biological "vulnerability"? Failed problem solutions? Building a habituation.		Psychological and biological-based dependence. Loss of control. Denying of illness circumstances. Dysfunctionality of the reward system. Addiction memory. A nearly autonomous triggering of addiction behavior. Absorption of interests and activities.						
Addiction therapy (b)	**=**	**Contact / motivation / withdrawal**	**X**	**Insight into the disease and acceptance of it**	**X**	**Psychotherapy of causes**	**X**	**Alternatives**	**X**	**Relapse prevention**
		Intrinsic / extrinsic motivation? Readiness for a comprehensive treatment? Abstinence initiation. Assistance in the maintenance of abstinence. For example: self-control methods, inpatient treatment.		Recognizing the loss of control. Acceptance of addiction and a permanent "handicap". Dealing with the consequences of the addictive behavior.		Reasons for starting the addiction behavior? Psychological and social burdens that have given rise to gambling use? Affective regulation through gambling? What should be different in the future? Social competence?		Reconstruction of the reward system by "overwriting" the addiction memory. Extending one`s range of interests and activities. Develop reward-able alternatives.		Despite positive changes in all previous therapy steps, the addiction memory remains active. Earlier consumer incentives pose a risk of relapse. Recognizing relapse risk. Develop constructive coping strategies. Strive for a balanced meaningful lifestyle.

Figure 4: Addiction Formula – Relationship between Illness-Genesis and Therapy (Bachmann, 2017a)

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