Investigation Strategy for the Small Pedophiles World

Gianluigi Me
Università di Roma, "Tor Vergata," Italy

INTRODUCTION

Internet child pornography (CP) is one of the most rapidly growing problems on the Net. In particular, pedophilia has been largely facilitated by the Internet, because it has enabled like-minded people to meet and fuel their sexual interests in children. In addition, the diffusion of pedophile material mainly occurs in almost-public fields like the World Wide Web, mailing lists, newsgroups, and bulletin boards, where anonymity and confidentiality obscure most of the communication parties and content causing difficulties for investigative analysis.

The results of the "Operation Hamlet—De Iniqua Turpitudine" investigation led us to analyze the behavior of the affiliates of a pedophile criminal association, its rules, and the payoff of the affiliates. Since the production of the CP—representing the main target of the implicated criminal associations—is governed by well-established rules, this article will suit the *small world problem* of the pedophile phenomenon and is useful in establishing some investigative patterns. For this reason, this article will firstly give the relevant investigative aspects of the CP crimes, then, utilizing the mathematics of the birthday paradox, it will present some considerations related to the law enforcement (LE) investigation task.

BACKGROUND

Operation Hamlet: De Iniqua Turpitudine

"Operation De Iniqua Turpitudine" (DIT) represents the Italian branch of Operation Hamlet, involving many different European countries, which ended with several arrests of pedophiles. In particular, the DIT operation investigated the activities of the affiliates of an Internet-based criminal association composed of several pedo-pornographers, familiar with information and communication technologies (e.g., they managed their own server) and cryptography tools (e.g., PGP). Furthermore, this criminal association, structured with watertight compartments, focused its activity mainly on child pornography production and on the organization of child fetishism meetings. The investigation was carried out mainly by overcoming the cryptography applied to ICQ message system log files. This activity enabled the detailed reconstruction of all criminal activities in the period of 2000-2002, and the recovery of most of the illegal materials produced, leading finally to victim identification and the imprisonment of several pedo-criminals.

Analysis

The scientific research and criminological analysis related to the evidence has:

- demonstrated recurrent behaviors pointed out in the literature (Becker, 1968; Thimbleby, Duquenoy, & Beale, 1998; De Boni & Prigmore, 2003; Kelly & Reagan, 2000; Glaeser, Sacerdote, & Scheinkman, 1996), confirming the deep behavioral difference between producers and users of child pornography
- pointed out how the pedo-pornographic ring's affiliates search for the "souvenir boxes": monothematic and multimedia compositions, each one focusing on a single victim
- made possible the application of Becker's (1968) mathematical models to the pedophile ring's world and, in particular, to the associative, un-negotiated context
- focused attention on the group's internal procedures, called "*mutual involvement,*" which are oriented to avoid the risk of infiltration by law enforcement agencies and to warrant the authenticity of the video and the graphic material produced and spread

- localized the channels used to auto-finance the costs (e.g., technical management of the ring, to the XDSL connections, to the payment towards Web hosting providers) of the group

The Birthday Paradox

The birthday paradox (a special case of the classical occupancy problem [Bloom, 1973]) answers the question: "Imagine a soccer game. There are 23 people in a soccer field (22 players plus the referee). What is the probability that at least two of them share the same birthday—the same day of the same month?" The result, typically non-intuitive, is 0.5, for N=23: it derives from the fact that 23 people form 253 pairs (since the first player can be coupled with the remaining 22 people; the second player can be coupled with the remaining 21, etc.).

Firstly, let us nominate the number of permutations of *k-uple* over a *n* rank alphabet (n=365 in this case) as n^k, and the number of permutations without repetition as:

$$\frac{n!}{(n-k)!} \tag{1}$$

Consider *p* as the probability of the event of two people sharing the same birthday.

Choosing uniformly and randomly from the set of all the possible permutations, the probability of the complementary event *q* (no birthdays coincide) is:

$$q = \frac{1}{n^k} \cdot \frac{n!}{(n-k)!} = \frac{(n-k+1)!}{n^k} \tag{2}$$

Since *p=(1-q)* the probability can be expressed, for $1 \leq k \leq n$, as:

$$p = 1 - \frac{n(n-1)(n-2)...(n-k+1)}{n^k} \tag{3}$$

Using the Taylor series for the approximation of exponential series, we can write the last term of (Equation 3) as:

$$q \leq \prod_{j=1}^{k-1} e^{-\frac{j}{n}} = e^{-\sum_{i=1}^{k-1}\frac{j}{n}} = e^{-\frac{k(k-1)}{2n}} \tag{4}$$

Calculating $q \leq 0{,}5$, if:

$$k \geq \frac{1}{2}\left(1 + \sqrt{1 + 8n\log 2}\right) \tag{5}$$

then $k \cdot (k-1) = 2n\log 2$ thus

$$q \leq e^{\frac{(-k(k-1))}{2}} \leq \frac{1}{2} \tag{6}$$

Therefore, the probability p=1-q that two people have the same birthday is at least 0.5 when (Equation 5) is true. To easily manage the function, we can consider an approximation of the last term of (Equation 4), depicted in Figure 1, leading to

$$P \approx 1 - e^{-\frac{k^2}{2n}} \tag{7}$$

The solution for the birthday paradox can be obtained by the simple substitution of n=365.

A Complementary Benefit: Situational Crime Prevention

The results of this article can offer complementary benefits to the Situational Crime Prevention (SCP) approach to Internet CP and pedophilia, due to the increased risk to the pedophile when collecting the pictures and in order to improve the LE capability to threaten the pedophiles.

The SCP refers to a preventative approach that relies upon the reduction of the opportunities for crime, according to the emergent criminological theories focusing on the relationship between the offender and the actual environment where the crime takes place:

- **Routine Activity** (Cohen & Felson, 1979) explains how changes in society in the numbers of "suitable targets" for crime, or in the numbers of the "capable guardians" against crime results, can lead to more or less crime. The Routine Activity theory assumes that crime occurs when a motivated offender and a suitable target (or victim) converge in space and time in the absence of a capable guardian.