

The Effects of Caffeine and Methylphenidate on Hyperactive Children

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Abstract. Twenty-one hyperactive children received in turn 500 mg. caffeine, 300 mg. caffeine, and 20 mg. methylphenidate per day in a double-blind crossover design investigation. Each drug was given for three weeks. Methylphenidate resulted in significantly improved behavior in the children as rated by mothers and teachers, and on tests of impulsivity and motor control. There were no significant improvements in either of the caffeine conditions, although some children showed some slight improvements with caffeine. The negative side effects with both caffeine and methylphenidate were minimal.

A great deal has been written about the problem of hyperactivity which is estimated to affect between 5 to 10% of elementary school children (Firestone et al., 1978b; Heussy, 1967; Stewart et al., 1966). Although hyperactive children are usually described as restless and always on the go, recent research has suggested that more central to the disorder is a limited attention span, difficulty with impulse control, and low frustration tolerance (Douglas, 1972; Dykman et al., 1971).

Stimulant drugs (methylphenidate and the amphetamines) have emerged as the "drugs of choice" in the treatment of hyperactivity, and there is considerable evidence attesting to their effectiveness (Conners, 1974; Gross and Wilson, 1974; Knights and Hinton, 1969; Sprague and Sleator, 1973; Sprague and Werry, 1974). Stephen et al. (1974) report that methylphenidate is the most fre-

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quently prescribed medication because of the reported, but undemonstrated, lower frequency of side effects.

Reviews of the clinical studies using methylphenidate for hyperactivity optimistically report improvement rates of up to 83% (Barkley, 1977; Knights, 1974; Whalen and Henker, 1976). Laboratory investigations have also demonstrated the positive effects of methylphenidate. Several researchers have shown that hyperactives show improved mean reaction times and decreased response variability (Cohen et al., 1971; Sprague et al., 1970), increased vigilance (Conners et al., 1969; Sykes et al., 1971, 1972), and improved impulse control (Campbell et al., 1971; Sykes et al., 1971). Other studies have indicated that methylphenidate can be instrumental in improving classroom behavior, group participation, and attitude toward authority in a classroom setting (Conners, 1971; Denhoff et al., 1971).

In spite of the positive effects with the stimulants on various aspects of the hyperactive syndrome, many of those taking these drugs develop annoying and sometimes serious side effects. Loss of appetite and sleeplessness are two well-documented side effects (Cole, 1975; Millichap and Fowler, 1967). In addition, potentially dangerous heart-rate changes (Cohen et al., 1971; Knights and Hinton, 1969; Winsberg et al., 1975) and retardation in height and weight (Safer, 1971; Safer et al., 1972; Weiss et al., 1975) have been found in children in chronic treatment with the stimulants. However, more recent work indicates that there is a considerable growth rebound following the withdrawal of drugs which leads to normal growth patterns (Safer et al., 1975).

Recent studies have suggested that caffeine may be an alternative form of pharmacological treatment for hyperactives that may result in fewer side effects than methylphenidate. Schnackenberg (1973) took 11 children from his private practice, who were responding with negative side effects, off their Ritalin regimen and instructed their parents to substitute two cups of coffee in the morning and one at lunchtime. The total amount of caffeine ingested in one day was 250 to 300 mgs. Teachers, who reportedly were naïve to this change in medication, were asked to fill out a behavior rating scale (Davids, 1971) during the drug intervention, then while the children were on the medication holiday, and again while the children were receiving caffeine. Schnackenberg's data suggested that the children behaved as well on caffeine as on methylphenidate, but caffeine did not lead to any of the undesirable side effects that had been evident with the methylphenidate.