nomenon, now quite well documented in the case of open and cyclic diamine compounds and their derivatives, has been explained on the basis of neighboring group participation of the second nitrogen function (*21*). But an α cleavage of this type, without hydrogen rearrangement, is rare in the monoamine derivatives.

These compounds have been submitted for biological screening, and the results will be reported elsewhere.

Experimental Section

Elemental analyses were performed by Dr. Franz Pascher and Ellen Pascher, Mikroanalytisches Laboratorium, Bonn. Mass spectra (MS) were determined on a CEC 21-110 B spectrometer at 70 eV by Professor Manfred Hesse, University of Zürich, Switzerland (to whom I am grateful for helpful discussions). Unless otherwise mentioned, melting points were determined on a Kofler hot stage and are uncorrected. Infrared (IR) spectra were obtained on a Unicam Model SP 1000 spectrophotometer in Nujol mulls. Nuclear magnetic resonance (NMR) spectra were measured on a Varian Associates T-60 instrument, in $CDCl_3$. All peak positions were measured in ppm relative to tetramethylsilane (Me_4Si) as an internal standard ($\delta_{Me_4Si} = 0$). The J values were recorded in hertz.

***Thermal Method. Typical Procedure. N-Benzyl-4-methylbenzamide* (4).** A mixture of 4-methylbenzoic acid (27.2 g, 0.2 mol), benzylamine (21.4 g, 0.2 mol), and 50 mL of *o*-xylene was placed in a 100-mL round-bottomed flask equipped with a reflux condenser and a Dean-Stark apparatus and heated in an electrical heating mantle for 7.5 h when distillation of water ceased. Xylene was removed by distillation, the reaction mixture cooled to room conditions, 50 mL of ice cold water added, and the slurry filtered. The cake was further washed with two portions of 50 mL of cold water, 50 mL of 2 N cold aqueous hydrochloric acid, 50 mL of saturated aqueous sodium bicarbonate, and finally water, to give 40.0 g of dry crude. Crystallization from ethanol (95%) gave 34.0 g of colorless needles. Further purification was done by sublimation in vacuo.

***Acid Chloride Method. Typical Procedure. N-Benzyl-2-hydroxybenzamide* (7).** A mixture of salicylic acid (13.8 g, 0.1 mol) and 10.5 mL of thionyl chloride was refluxed for 2 h after which excess reagent was distilled off to give a residual glass, which was taken up in 40 mL of dry benzene. To this was added cautiously, with stirring and cooling (ice bath), a mixture of benzylamine (10.7 g, 0.1 mol) and 15.0 g of triethylamine over 0.5 h; the final solution was allowed to stand for 18 h. Benzene was removed in vacuo to give 18.0 g of crude after normal work-up. Crystallization from ethanol gave 14.1 g of colorless prisms.

Treatment of the benzylammonium salt in *o*-xylene at reflux led to extensive decarboxylation to phenol. The same phenomenon was observed with the salt of 2-methoxybenzoic acid, which also yielded a small portion of **7**.

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Potential Central Nervous System Active Agents. 2. Synthesis of *N*-Benzylphenylacetamides

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Six *N*-benzylphenylacetamides variously substituted on the acyl part with chloro, methyl, or methoxyl groups, including five new ones, were synthesized by heating their corresponding *N*-benzylammonium salts in *o*-xylene. Their IR, NMR, and mass-spectral (MS) data are presented and compared with those of the *N*-benzylbenzamides and *N*-benzylacetamide, respectively.

In the preceding communication (*1*), the synthesis and the spectroscopic data (IR, MS, NMR) of several *N*-benzylbenzamides, substituted on the acyl part and including the (*E*)-cinnamamide derivative, were reported. Presented in the present communication are the synthesis and the spectroscopic data of six *N*-benzylphenylacetamides, variously substituted on the acyl part with chloro, methyl, or methoxyl groups. Data for *N*-benzylacetamide (**7**) are included for comparison. The compounds were synthesized from their corresponding *N*-

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Table I. Experimental Data for the *N*-Benzylphenylacetamides and *N*-Benzylacetamide

compd	mol formula	$M^{+\cdot}$	yield,[a] %	mp, °C exptl	mp, °C reported
1	$C_{15}H_{15}NO$	225	96[b]	119–120[c]	121.5 (*5*)
2	$C_{16}H_{17}NO$	239	67[d]	114–115	
3	$C_{16}H_{17}NO$	239	42[b]	137[e]	
4	$C_{16}H_{17}NO_2$	255	50[d]	77–78	
5	$C_{16}H_{17}NO_2$	255	42[b]	137–137.5	
6	$C_{15}H_{14}ClNO$	259/261	35[b]	155–156	
7, *N*-benzylacetamide	$C_9H_{11}NO$	149	*f*	60–61[c]	60–61 (*6*)

[a] Yields from first crop only. The crude yields were quantitative and homogeneous (thin-layer chromatographic evidence). [b] From ethanol. [c] From sublimed sample. [d] Ethanol-water. [e] Sublimes. [f] Attempted synthesis of *N,N*-dibenzylmalonamide in boiling *o*-xylene gave only the acetate (7) in 50% yield (*6*).

Table II. IR and NMR Spectral Data for the *N*-Benzylphenylacetamides and *N*-Benzylacetamide (7)[a]

	IR, cm^{-1}				proton NMR δ					
		amide band								
compd	NH	I	II	others	$PhCH_2CO$	aromatic (A and B)	NH (a)	CH_2 (b)	$J_{a,b}$	others
1	3285	1649	1560	1590	3.62 s	6.90–7.50	6.15 br	4.43 d	6	
2	3260	1650	1550	1590 sh						
				1610 sh	3.60 s	6.80–7.40	5.77 br	4.37 d	6	2.27 (s, $PhCH_3$)
3	3280	1640	1550	1610	3.54 s	6.60–7.60	6.04 br	4.39 d	6	2.32 (s, $PhCH_3$)
4	3260	1655	1560	1609	3.57 s	6.30–7.40	6.17 br	4.35 d	6	3.70 (s, $PhOCH_3$)
5	3290	1649	1560	1618, 1590	3.52 s	6.60–7.60	6.05 br	4.40 d	6	3.76 (s, $PhOCH_3$)
6	3280	1640	1550	1610	3.50 s[b]	7.32 (m, A)				
						7.25 (m, B)	8.46 br	4.28 d	6	
7	3283[c]	1645	1555	1635 sh, 1590		6.80–7.40	*d*	4.26 d	6	1.83 (s, CH_3CO)

[a] Symbols: br = broad signal; s = singlet; d = doublet; m = multiplet. [b] Measured in $(CD_3)_2SO$. [c] Measured in KBr. [d] Signal occurs in the aromatic region.

Table III. Relative Intensities of Characteristic Signals in the Mass Spectra of the *N*-Benzylphenylacetamides and *N*-Benzylacetamide (7) at 70 eV[a]

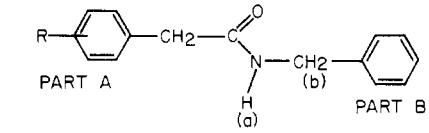
	relative intensities, %												
	ion				*m/e*[b]								
compd	$M^{+\cdot}$	$M^{+\cdot}-1$	$R\text{-}PhCH_2CO^+$	$R\text{-}PhCH_2^+$	107	106	105	92	91	77	65	51	39
1	18				5	10	3	28	100	6	19	8	12
2	27			94	6	53		9	100	18	14	8	9
3	35		1	100	6	73		6	79	19	13	9	8
4	25			44	7	8	5	9	100	8	18	7	6
5	24			100	6	4	1	3	42	14	9	7	5
6	12/4			31/10		3	1	8	100	3	10	4	6
7	64	4	42 (CH_3CO^+)		23	100	3	3	30	15	10	13	7

[a] Low-resolution spectra; where mass of ion is same as that of *m/e*, the latter is quoted. [b] *m/e* 107 = $PhCH_2NH_2^{+\cdot}$; *m/e* 106 = $PhCH{=}NH_2^+$; *m/e* 105 = $PhCH{=}NH^+$; *m/e* 92 = $C_7H_8^+$; *m/e* 91 = $PhCH_2^+$; *m/e* 77 = Ph^+; *m/e* 65 = $C_5H_5^+$; *m/e* 51 = $C_4H_3^+$; *m/e* 39 = $C_3H_3^+$.

benzylammonium salts according to the method of Fieser and Jones (*2*) as has been described earlier (*1*). With the exception of the *N*-benzylphenylacetamide **1** and the acetate (**7**), all compounds described herein are previously unreported. These compounds have been submitted for biological screening, and the results will be reported elsewhere.

The experimental data on all of the compounds are summarized in Table I. The IR and NMR data are presented in Table II, while those of the mass spectra are in Table III. Satisfactory elemental analyses (±0.4% for C, H, N, and halogen, where present, for new compounds; N, for known) were obtained for all compounds.

The IR spectra of these derivatives show absorption in the region 3260–3290 cm^{-1} for the amide N–H stretching vibration. As to be expected, the amide I and II bands occur in the regions 1640–1655 and 1555–1560 cm^{-1}, respectively. As usual, the NMR spectra of the compounds show a doublet between 4.28 and 4.43 ppm (J = 6 Hz, 2 H) due to the benzylic hydrogens of the B part ($PhCH_2NHCO$–) which are coupled to the NH proton (*3*). (This occurs as a variable broad signal in the aromatic region.) In addition, a singlet for two protons appears between 3.50 and 3.76 ppm, for the methylene group of the A part ($RPhCH_2CO$–).



no.	R	no.	R
1	H	4	2-OMe
2	2-Me	5	4-OMe
3	4-Me	6	4-Cl

Unlike the case of the acetate (**7**) and the benzamide derivatives, the mass spectra of the *N*-benzylphenylacetamide compounds lack the $M^{+\cdot}$ – R, $M^{+\cdot}$ – 1, and the acylium ions. The fragment ions *m/e* 107, *m/e* 106, and *m/e* 105 derived from the B part and associated with charge on nitrogen occur as minor peaks in the series. The observed low intensity of ions *m/e* 107 and *m/e* 106 in this series is surprising. The latter constitutes one of the major fragments in the spectra of the *N*-benzylbenzamide compounds and is the base peak in that of **7**, while the former ion, *m/e* 107, occurs as the base peak in the spectra of the *N,N*-diphenylphenylacetamide derivatives (*4*). The pathway to the genesis of this ion via an intramolec-

ular hydrogen transfer and loss of phenylketene seems to be suppressed in these compounds.

Experimental Section

Elemental analyses were performed by Dr. Franz Pascher and Ellen Pascher, Mikroanalytisches Laboratorium, Bonn. Mass spectra (MS) were determined on a CEC 21-110 B spectrometer at 70 eV, direct inlet, by Professor Manfred Hesse, University of Zürich, Switzerland (to whom I am grateful for helpful discussions). Unless otherwise mentioned, melting points were determined on a Kofler hot stage and are uncorrected. Infrared spectra (IR) were obtained on a Unicam Model SP 1000 spectrophotometer in Nujol mulls. Nuclear magnetic resonance (NMR) spectra were measured on a Varian Associates T-60 instrument, in $CDCl_3$. All peak positions were measured in ppm relative to tetramethylsilane (Me_4Si) as an internal standard ($\delta_{Me_4Si} = 0$). The J values were recorded in hertz.

***Typical Procedure. N-Benzylphenylacetamide* (1).** A mixture of phenylacetic acid (27.2 g, 0.2 mol), benzylamine (21.4 g, 0.2 mol), and 50 mL of *o*-xylene was placed in a 100-mL round-bottomed flask equipped with a reflux condenser and a Dean-Stark apparatus and heated in an electrical heating mantle for 6 h when distillation of water ceased. Work-up as usual gave 45.0 g of crude and 43.0 g from ethanol (95%). Further purification was done by sublimation in vacuo.

Acknowledgment

I thank Mr. O. O. Ibe for the IR and NMR spectra.

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